



国际民用航空组织

危险物品专家组 (DGP)

第二十九次会议

2023年11月13日至17日，蒙特利尔

报告夹

本报告中的材料未经空中航行委员会审议。报告所表达的观点应被视为专家组向空中航行委员会提出的建议，而不代表本组织的观点。在空中航行委员会审查本报告之后，将发布一份报告补篇，阐明空中航行委员会就报告采取的行动。

危险物品专家组 (DGP)
第二十九次会议 (2023 年)

送文函

收件人：空中航行委员会主席

发件人：危险物品专家组 (DGP) 主席 (2023 年)

我谨荣幸地提交危险物品专家组 (DGP) 第二十九次会议的报告，此次会议于 2023 年 11 月 13 日至 17 日在蒙特利尔举行。

主席



Teun Muller
(签名)

2023 年 11 月 17 日，蒙特利尔

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	1/1	对《危险物品安全航空运输技术细则》(Doc 9284 号文件) 进行拟议修订, 使其与联合国《关于危险货物运输的建议书》保持一致, 以便纳入 2025—2026 年版.....	1-5
	1/2	对《危险物品安全航空运输技术细则补篇》(Doc 9284SU 号文件) 进行拟议修订, 使其与联合国《关于危险货物运输的建议书》保持一致, 以便纳入 2025—2026 年版.....	1-6
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* 标注有“RSPP”的建议指的是对附件中标准、建议措施和空中航行服务程序或指导材料的修订提案。

	2/3	为应对航空特有的安全风险和所查明的异常情况对《与危险物品有关的航空器事故征候应急响应指南》（Doc 9481 号文件）进行修订，以便纳入 2025—2026 年版.....	2-6
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危险物品专家组 (DGP)

第二十九次会议

2023 年 11 月 13 日至 17 日，蒙特利尔

会议情况

1. 会期

1.1 危险物品专家组 (DGP) 第二十九次会议于 2023 年 11 月 13 日上午 10 时在蒙特利尔开幕，此次会议由空中航行委员会第一副主席梁均荣先生致开幕词。本次会议于 2023 年 11 月 17 日结束。

2. 出席情况

2.1 由二十一个缔约国和六个国际组织提名的成员和观察员及顾问等出席了本次会议，出席者名单如下：

成员	顾问	提名国
S. Bitossi		澳大利亚
L. Cascardo		巴西
D. Sylvestre	D. Bolton	加拿大
P. Guo	Q. Yang L.A. Yiu Wing	中国
P. Tatin	T. Chrupek	法国
S. Weizenhoefer		德国
A. Oheneba-Asare		加纳
P. Privitera	C. Carboni	意大利
T. Tabata	Y. Funai Y. Hara K. Nakano T. Okamoto A. Uchizawa	日本
T. Muller	E. Boon R. Dardenne T. Groffen H. Strijbosch K. Vermeersch	荷兰

成员	顾问	提名国
E. Gillett	M. Cowlshaw W. Herath	卡塔尔
S. Kang		大韩民国
M. A. de Castro		西班牙
G. Kiliç		土耳其
H. Almheiri	K. Al Hosani M. Ebrahim T. Howard A. Wagih	阿拉伯联合酋长国
M. Ranito		联合王国
D. Pfund	M. Givens K. Ranck K. Leary	美国
D. Brennan	P. Jala	国际航空运输协会 (IATA)
D. Ferguson		航空航天工业协会国际协调理事会 (ICCAIA)
S. Schwartz	M. Phaneuf D. Schlichting	航空公司驾驶员协会国际联合会 (IFALPA)
顾问		
A. Altemos G. Leach		危险物品咨询理事会 (DGAC)
观察员		
J. Wiren Bengtsson		丹麦
S. Hakola		芬兰
D. Kanlybayev T. Orimbekov		哈萨克斯坦
I. Alsayer		沙特阿拉伯
L. Calleja Barcena		欧洲航空安全局 (EASA)
A. McCulloch T. Rogers		全球快递协会 (GEA)
E. Remy C. Litus-Koza		北大西洋公约组织 (NATO)

3. 会议干事和秘书处

3.1 Teun Muller 先生（荷兰）当选为会议主席，Leonardo Cascardo 先生（巴西）当选为会议副主席。

3.2 会议的秘书是货物安全科技术干事 Lynn McGuigan 女士，她的助手是该科协理技术干事 Virgilio Alegre 先生。

4. 会议议程

4.1 空中航行委员会于 2023 年 5 月 4 日批准了下列会议议程。

议程项目 1: 国际民航组织危险物品的规定与联合国《关于危险货物运输的建议书》的协调统一（编号：REC-A-DGS-2025）

1.1: 如有必要，拟定对附件 18 —《危险物品的安全航空运输》的修订提案

1.2: 如有必要，拟定对《危险物品安全航空运输技术细则》（Doc 9284 号文件）的修订提案，以便纳入 2025-2026 年版

1.3: 如有必要，拟定对《危险物品安全航空运输技术细则补篇》（Doc 9284SU 号文件）的修订提案，以便纳入 2025-2026 年版

议程项目 2: 管理航空特有的安全风险和查明异常情况（编号：REC-A-DGS-2025）

2.1: 如有必要，拟定对附件 18 —《危险物品的安全航空运输》的修订提案

2.2: 如有必要，拟定对《危险物品安全航空运输技术细则》（Doc 9284 号文件）的修订提案，以便纳入 2025-2026 年版

2.3: 如有必要，拟定对《危险物品安全航空运输技术细则补篇》（Doc 9284SU 号文件）的修订提案，以便纳入 2025-2026 年版

2.4: 如有必要，拟定对《与危险物品有关的航空器事故征候应急响应指南》（Doc 9481 号文件）的修订提案，以便纳入 2025-2026 年版

议程项目 3: 促进危险物品的安全航空运输（编号：REC-A-DGS-2025）

议程项目 4: 管理航空载运锂电池带来的安全风险（编号：工作卡 DGP.003.04）

议程项目 5: 在附件 18 中明确国家监督责任（编号：工作卡 DGP.005.04）

议程项目 6: 支持遥控驾驶航空器系统（RPAS）运行的危险物品规定（编号：工作卡 DGP.007.01）

议程项目 7: 审查对危险物品有影响的附件 6 规定（REC-A-DGS-2025）

议程项目 8: 航空安保/危险物品的协调（REC-A-DGS-2025）

议程项目 9: 与其他专家组的协调

9.1: 飞行运行专家组 (FLTOPSP)

9.2: 适航性专家组 (AIRP)

9.3: 安全管理专家组 (SMP)

9.4: 遥控驾驶航空器系统专家组 (RPASP)

9.5: 任何其他专家组

议程项目 10: 《危险物品专家组 (DGP) 帮助编制技术细则和辅助文件的指导材料》与经修订的危险物品规定的协调统一

议程项目 11: 其他事项

5. 工作安排

5.1 专家组作为一个单一机构举行会议，并根据需要设立特设起草小组。主会场的讨论用阿拉伯文、中文、英文、法文、俄文和西班牙文举行。某些工作文件仅用英文提交。报告的叙述部分以阿拉伯文、中文、英文、法文、俄文和西班牙文印发，对《危险物品安全航空运输技术细则》及其《补篇》(Doc 9284SU 号文件)的修订以中文、英文、法文、俄文和西班牙文印发。

6. 空中航行委员会主席的开幕词

6.1 女士们、先生们，早上好。我是梁均荣，空中航行委员会第一副主席，我非常高兴欢迎各位来到蒙特利尔和国际民航组织总部参加本次危险物品专家组第二十九次会议。

6.2 上一次危险物品专家组会议是在 2021 年 11 月因 COVID 19 大流行而以虚拟方式举行的。我们很高兴看到你们回到总部，同时也感谢你们为成功推进 DGP/28 虚拟会议的工作所做的努力。委员会审查了 DGP/28 会议的报告，并建议理事会批准你们对《技术细则》及其补篇的拟议修订。这些修订已纳入该文件的 2023-2024 年版本。今年 3 月，理事会还根据你们的建议批准了《技术细则》2023-2024 版的增编，允许旅客和机组人员在托运行李中携带由小型锂电池供电的已激活装置。感谢你们的不懈努力，确保《技术细则》提供了一种危险物品安全航空运输的机制，同时考虑到现实世界的实际情况。

6.3 自危险物品专家组第二十八次会议以来，委员会批准了专家组成员的一些变动，包括增加五名新成员：

- 阿根廷提名的 Natalia Jimena Luro 女士；
- 加纳提名的 Alice Oheneba-Asare 女士；
- 印度提名的 Neeraj Kumar 先生；
- 土耳其提名的 Göğem Kiliç 博士；和
- 新西兰最近提名的 Jim Finlayson 先生。

委员会还批准了接替离任成员 Masaomi Araya 先生、Jacky Hanafin 女士、Cara Ruzicka 女士（接替 Hanafin 女士）和 Sarah Cumberbirch 女士的提名。他们由日本提名的 Tsutomu Tabata 先生、联合王国提名的 Mario Ranito 先生和加拿大提名的 Daniel Sylvestre 先生接替。成员变动后，专家组由二十二个国家和三个国际组织提名的二十五名成员组成。

6.4 我相信，在你们的专家组会议开幕式上，每一位空中航行委员会主席都提到了我要讲的这一点。这是一个值得重复的重要问题。请记住，你们是以个人专家身份参加，而不是作为提名国的代表。因此，各位成员应发表自己的专业意见，而不是某个国家或国际组织的既定政策或观点。我直接引用了《空中航行委员会专家组指令》中的这段话。所有成员在获准加入时都应得到一份该文件的副本。这是一份重要文件，应不时阅读，以了解为开展专家组工作而制定的广泛指令和指导。如果你们不再有这份文件，秘书处可安排向你们提供一份。

6.5 委员会非常感谢每位离任成员的贡献，并欢迎新成员。我们高度赞赏所有成员的工作，但我要特别感谢你们每个专门工作组的领导人。特别感谢 Hamad Almheiri 先生和 Ahmed Wagih 先生领导了关于澄清附件 18 中国家责任的工作；Duane Pfund 先生和 Kevin Leary 先生领导了锂电池安全风险评估工作；Dave Brennan 先生领导了使技术细则和相关危险物品文件与《联合国规章范本》相一致的工作。我相信，你们的工作将极大地促进专家组本周的审议工作。委员会期待听取专家组关于这些问题的建议。我还要特别感谢在 DGP/28 会议上当选为主席的 Teun Muller 先生。我知道他发挥了重要作用，确保危险物品专家组以有序和全面的方式审议所有讨论要点，以期达成共识协议。委员会相信，你们将保持在前几次会议上表现出的高标准。

6.6 我还想提及今年 9 月 1 日举行的第二次专家组主席圆桌会议。会议讨论了专家组的工作方法、战略和主题事项。空中航行委员会的一个小型非正式小组分析了会议成果，并提出了处理关于专家组报告、工作卡审批和专家组之间协调等相关问题的行动建议。航委会同意将相关项目纳入其程序事项全体工作组今后的工作。航委会还认为有必要加强全球空中航行计划（GANP）研究组与其他专家组之间的联系。如果你们在工作中需要任何帮助，我相信你们的主席会毫不犹豫地 向秘书处或我本人求助。

6.7 我和各位委员期待着在专家组会议结束时听取你们的汇报，了解你们所取得的成就。

6.8 在此，我宣布危险物品专家组第二十九次会议开幕，并祝各位工作顺利，在蒙特利尔逗留愉快。

议程项目 1: 国际民航组织危险物品的规定与联合国《关于危险货物运输的建议书》的协调统一 (编号: **REC-A-DGS-2025**)

1.1: 如有必要, 拟定对附件 18 — 《危险物品的安全航空运输》的修订提案

专家组未发现为与联合国《关于危险货物运输的建议书》保持一致而需要对附件 18 进行的任何修订。

- 议程项目 1: 国际民航组织危险物品的规定与联合国《关于危险货物运输的建议书》的协调统一（编号：REC-A-DGS-2025）
- 1.2: 如有必要，拟定对《危险物品安全航空运输技术细则》（Doc 9284 号文件）的修订提案，以便纳入 2025—2026 年版

1.2.1 对《技术细则》的修订草案，以便与联合国《建议书》保持一致

背景

会议审查了对《技术细则》的修订，以反映联合国危险物品运输和全球化学品统一分类和标签制度专家委员会（以下在报告中简称为“UNCOE”）第十一届会议（2022 年 12 月 9 日，日内瓦）所做的决定。修订由危险物品专家组与联合国协调统一工作组（DGP-WG/UN Harmonization）拟定，并在 2023 年危险物品专家组工作组会议（DGP-WG/23 会议，2023 年 5 月 15 日至 19 日，巴西里约热内卢）上进行了初步审查（见 DGP-WG/23 会议报告第 4.1.2.1 段）。DGP-WG/23 会议之后，危险物品专家组与联合国协调统一工作组继续进行了审查，并提出了进一步修订的建议。下文关于 DGP/29 会议的讨论报告对这些修订作了说明。

1.2.1.1 第 1 部分（DGP/29-WP/11 号文件）

1.2.1.1.1 会议同意了向 DGP-WG/23 会议提交的第 1 部分修订，但需进行编辑修改，删除第 1 部分 1.1.5.1 i) 中关于数据记录器和货物追踪仪新例外中的冗余案文。

1.2.1.2 第 2 部分（DGP/29-WP/12 号文件和 DGP/29-WP/12 号文件增编）

1.2.1.2.1 会议同意了向 DGP-WG/23 会议提交的第 2 部分修订，前提是：

- a) 简化关于澄清 2;2.9.3 g) 锂离子电池和 2;2.9.4 钠离子电池项下“提供试验概要”意图的注释，删除多余的“锂电池芯或电池或已安装锂电池芯或电池的设备”和“钠离子电池芯或电池或已安装钠离子电池芯或电池的设备”的提法。
- b) 将 2;9.3 a) 中关于锂电池的现有注释（即澄清指出电池必须满足《联合国试验和标准手册》第 III 部分 38.3 小节规定的试验要求，即使组成电池的电池芯已通过试验）复制到 2;9.4 a) 中关于钠离子电池的新规定之下。
- c) 更正表 2-7 中的排印错误，确保与《联合国规章范本》保持一致；
- d) 在 A 类感染性物质示例下增加一个脚注，说明猴痘病毒已被世界卫生组织（WHO）更名为“Mpox”。对于是否有此必要进行了一些讨论，因为《联合国规章范本》第 23 修订版仅提及猴痘。专家组最终得出结论认为，增加“Mpox”的提法是有利的，因为该术语将得到更广泛的使用，而且不会产生任何负面影响，因为它与猴痘是同义词。

1.2.1.3 第 3 部分 (DGP/29-WP/13 号文件和 DGP/29-WP/13 号文件增编)

1.2.1.3.1 会议同意了向 DGP-WG/23 会议提交的第 3 部分修订，但需纳入以下补充修订：

- a) 作出修改，以消除“锂离子”、“锂金属”、“钠离子”和“电池或电池芯”等提法之间的不一致；
- b) 修订特殊规定 A214，增加所缺失的对 UN 3171 运输专用名称的提及；
- c) DGP-WG/23 会议讨论了与《联合国规章范本》第 23 修订版的一项新增特殊规定 (SP400) 有关的潜在问题，涉及 UN 3551 — 钠离子电池、UN 3552 — 装在设备中的钠离子电池和 UN 3552 — 与设备包装在一起的钠离子电池。该条款规定，只要符合某些标准，钠离子电池和电池芯就不受管制。其中一项标准是要求电池芯或电池以电池芯或电池不包含电能的方式短路。DGP-WG/23 会议提出了以下问题：
 - 1) 这项规定意味着风险低到足以使这些电池不受管制，似乎与特殊规定中其他条件的必要性相矛盾，包括锂电池标记的应用。锂电池标记的应用可能会导致收运程序受到干扰，这就否定了特殊规定的意图。秘书处向联合国危险货物运输问题专家小组委员会第六十三届会议（为简洁起见，下称为联合国小组委员会）（2023 年 11 月 27 日至 12 月 6 日，日内瓦）提交了一份工作文件，建议取消 SP 400 中的标记要求；和
 - 2) 特殊规定限制了每个电池芯中包含的危险物品的种类和数量（包括作为电池组件的危险物品的种类和数量），只允许按照限制数量规定予以运输，包括危险物品一览表中规定的数量限制。DGP-WG/23 会议询问，除电池制造商外，其他人如何知道电池芯中所含危险物品的种类和数量。根据限制数量规定来实施数量限制具有挑战性，因为航空运输模式的数量限制低于其他运输模式。

专家组一致认为，不应将特殊规定列入《技术细则》。专家组的结论是，至少在获得更多经验和收集更多数据之前，保守的做法是最佳的前进方式。如果所发现的问题得到解决，将来可以考虑免除管制。

1.2.1.4 第 4 部分 (DGP/29-WP/14 号文件和 DGP/29-WP/14 号文件增编)

1.2.1.4.1 会议同意了提交给 DGP-WG/23 会议的第 4 部分修订，但需纳入以下补充修订：

- a) 修订了包装说明 950，在该包装说明中提及金属钠或钠合金电池，以便与包装说明 952 的类似修订保持一致；
- b) 进行了编辑修订，以消除包装说明 952、965 至 970 和 976 至 978 中关于锂离子电池、锂金属电池和钠离子电池包装之间的不一致）。
- c) 进行了修订，以确保特殊规定 A214 和包装说明 952 之间的一致性；

- d) DGP-WG/23 会议讨论了钠离子电池包装说明的结构，以及是否应将其纳入现有的锂离子电池包装说明（包装说明 965、966 和 967），或是纳入一个涵盖 UN 3551 — 钠离子电池、UN 3552 — 装在设备中的钠离子电池和 UN 3552 — 与设备包装在一起的钠离子电池的新包装说明中，或是分别纳入三个新的单独的包装说明中。同意将这些规定纳入三个单独的包装说明，以便与锂离子电池和锂金属电池的做法保持一致。
- e) 将“锂电池标记”和“钠离子标记”的提法改为“电池标记”（见第 1.2.1.5 b) 段）。
- f) 修订了包装说明 869，以纳入缺失的对镓的提及。

1.2.1.5 第 5 部分（DGP/29-WP/15 号文件和 DGP/29-WP/15 号文件增编）

1.2.1.5.1 会议同意了提交给 DGP-WG/23 会议的第 5 部分修订，但需纳入以下补充修订：

- a) 进行了编辑修订，以消除对锂离子、锂金属和钠离子及电池或电池芯之间的一致提法；
- b) 将“锂或钠离子电池标记”的提法改为“电池标记”。会议认为较长的名称既繁琐又无必要。会议考虑了除非对《规章范本》进行修改，否则不作任何修改，但得出结论认为在《技术细则》中更改名称不会产生任何后果，因为在任何文件中都不需要提及该名称。因此，修改名称不会产生监管影响。

1.2.1.6 第 6 部分（DGP/29-WP/16 号文件和 DGP/29-WP/16 号文件增编）

1.2.1.6.1 会议同意了提交给 DGP-WG/23 会议的第 6 部分修订，但须对国际标准化组织的参引进行编辑修订，以与《联合国规章范本》保持一致。在 6;5.2.11.2 项下的注释中发现了英文版和法文版之间存在一处不一致，英文版中说“如果没有按照……进行标记”，而法文版中说“按照……进行标记”。按照英文版调整了 DGP/29-WP/16 法文版的文本。秘书处将把《联合国规章范本》中的不一致之处通知联合国小组委员会。

1.2.1.7 DGP-WG/23 会议拟定的对《技术细则》附篇 2 的修订（DGP/29-WP/20 号文件）

1.2.1.7.1 会议同意了提交给 DGP-WG/23 会议的对附篇 2 的修订。

1.2.1.8 纠正对 UN 3363 运输专用名称不完整提法的编辑修订（DGP/29-WP/34 号文件）

1.2.1.8.1 会议同意了一项编辑修订，以纠正对 UN 3363 运输专用名称的不完整提法。UN 3363 下分配了三个运输专用名称，其中一个已添加到《技术细则》2021-2022 年版中（UN 3363 — 物品中的危险物品）。所作修订将该运输专用名称添加到两处提及 UN 3363 但未包含此运输专用名称之处，即 2;6.0 和表 3-1 中对 UN 3363 的交叉参引之处（“燃料电池组件”）。

1.2.2 建议

1.2.2.1 根据上述讨论，会议拟定了以下建议：

建议 1/1 — 对《危险物品安全航空运输技术细则》（Doc 9284 号文件）进行拟议修订，使其与联合国《关于危险货物运输的建议书》保持一致，以便纳入 2025—2026 年版

将报告附录 A 中确定为“为与联合国保持一致而进行修订”所涉及的修订纳入《技术细则》中。

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- 议程项目 1: 国际民航组织危险物品的规定与联合国《关于危险货物运输的建议书》的协调统一（编号：REC-A-DGS-2025）
- 1.3: 如有必要，拟定对《危险物品安全航空运输技术细则补篇》（Doc 9284SU 号文件）的修订提案，以便纳入 2025—2026 年版

1.3.1 危险物品专家组工作组 2022 年会议（DGP-WG/22）和危险物品专家组工作组 2023 年会议（DGP-WG/23）制定的对《技术细则补篇》的修订（DGP/29-WP/19 号文件和 DGP/29-WP/19 号文件增编）

1.3.1.1 《技术细则补篇》的修订草案由危险物品专家组与联合国协调统一工作组拟定，以反映联合国危险物品运输和全球化学品统一分类和标签制度专家委员会所作的决定。在 DGP-WG/23 会议上对危险物品专家组与联合国协调统一工作组的输出文稿进行了初步审查。危险物品专家组与联合国协调统一工作组在 DGP-WG/23 会议之后继续进行了审查，并建议如下：

- a) 将特殊规定 A331（批准在货机上装运荷电状态较高的锂离子和钠离子电池的规定）和 A334（通过批准在客机上装运锂离子和钠离子电池的标准）归入 UN 3551 —— 钠离子电池，并修订特殊规定，以纳入对钠离子电池芯或电池的提及；和
- b) 对于质量超过 35 千克并通过批准装运的电池芯和电池，将 UN 3551 和 UN 3552 —— 装在设备中的钠离子电池和与设备包装在一起的钠离子电池的提法纳入包装说明 974 中；

1.3.1.2 专家组决定不在表 S-3-1 中提及 UN 3553 —— 二硅烷或 UN 3555 —— 丙酮中的三氟甲基四唑钠盐的包装说明和每个包装件的最大净含量限值，因为专家组没有足够的信息，无法向考虑给予这两种物质运输豁免的国家提供指导。它标明这些物质禁止在客机和货机上运输。

1.3.2 建议

1.3.2.1 根据上述讨论，会议拟定了以下建议：

建议 1/2 —— 对《危险物品安全航空运输技术细则补篇》（Doc 9284SU 号文件）进行拟议修订，使其与联合国《关于危险货物运输的建议书》保持一致，以便纳入 2025—2026 年版

将报告附录 B 中确定为“为与联合国保持一致而进行修订”所涉及的修订纳入《技术细则补篇》中。

议程项目 2: 管理航空特有的安全风险和查明异常情况 (编号: REC-A-DGS-2025)

2.1: 如有必要, 拟定对附件 18 — 《危险物品的安全航空运输》的修订提案

2.1.1 对集装箱定义的修订

2.1.1.1 会议同意了对附件 18 和《技术细则》中集装箱 (ULD) 定义的修订, 删除了对“冰屋”等过时技术的提及。修订还删除了“任何类型的货运集装箱”的提法, 因为会议认为这使得集装箱的范围过于宽泛。对“货运集装箱”有一个单独的定义, 仅适用于第 2 部分 7.1.3 所包括的放射性物质的运输, 而在集装箱定义中提及货运集装箱一词给各国和行业造成了困惑。

2.1.1.2 这一修订首先是在 DGP-WG/23 会议上讨论的。同时讨论了对《技术细则》的同一修订 (见 DGP-WG/23 会议报告第 4.2.2.6 段)。还向 DGP-WG/23 会议提出了对《技术细则》中货运集装箱定义的相应修订。虽然当时没有强烈反对意见, 但成员们希望有更多的时间来收集所作的有关假设的信息, 以确保这些假设是有效的, 并确保修订不会产生任何意想不到的后果。DGP/29 会议同意了 DGP-WG/23 会议提出的对附件 18 的修订, 但须删除“集装箱”之前的“航空器”一词。根据集装箱的定义方式, 将“航空器”一词纳入定义被认为是多余的, 并将导致在附件 18 和《技术细则》中对集装箱的每一处提及都作出不必要的修改。在附件 18 的修订通过之前, 对集装箱和货运集装箱定义的修订将不会纳入《技术细则》。

RSPP

建议 2/1 — 对附件 18 中集装箱 (ULD) 定义的修订

征求各国对附件 18 中“集装箱”定义的拟议修订的意见, 该拟议修订载于本议程项目报告的附录中。

- 议程项目 2: 管理航空特有的安全风险和查明异常情况 (编号: REC-A-DGS-2025)
- 2.2: 如有必要, 拟定对《危险物品安全航空运输技术细则》(Doc 9284 号文件) 的修订提案, 以便纳入 2025—2026 年版

2.2.1 危险物品专家组工作组 2023 年会议 (DGP-WG/23) 商定的对《技术细则》第 8 部分的修订草案 (DGP/29-WP/18 号文件)

2.2.1.1 会议审查了 DGP-WG/22 和 DGP WG/23 会议上商定的对《技术细则》的修订, 以便利运输旅客和机组成员携带的危险物品。其中一项是编辑修订, 以解决货物定义与旅客规定之间不一致, 货物定义中提到了“处理不当的行李”, 而旅客规定则根本没有提及这一术语。会议同意 DGP-WG/22 会议提出的修订, 将该术语纳入旅客规定。第二项修订是增加一个注, 澄清对仍安装在代步工具内的锂电池没有瓦时限制。第三项修订涉及旅客和机组成员携带由小型锂电池供电以保持激活状态的装置的规定。根据 DGP-WG/22 会议提出的一项提议, 通过理事会批准的一项增编, 将这一修订纳入了 2023-2024 年版。获得批准的增编是 DGP-WG/22 会议所商定内容的修订版本。最初的修订将托运行李中的所有装置都应防止损坏和意外启动的要求扩大到客舱内携带的装置。然而, 工作组忽略了这一额外要求, 也没有在 DGP-WG/22 会议上予以讨论。对国家和行业的影响也没有得到考虑, 因此工作组决定将其从拟议修订中删除, 并在今后予以考虑。此后, 专家组成员对其进行了进一步审议, 并同意增加一项要求, 即客舱内携带的装有锂电池的装置应受到保护, 以防损坏和意外启动。

2.2.1.2 第 8 部分标题与第 8;1.1 段标题和表 8-1 的标题在“旅客或机组成员携带的危险物品”和“旅客和机组成员携带的危险物品”的提法方面存在不一致, 这一点是在澄清附件 18 中国家监督责任的工作中发现的 (见议程项目 5 的报告)。专家组认为提及“旅客和机组成员”更为合适, 并同意对第 8;1.1 段的标题和表 8-1 的标题作出相应修改。

2.2.2 托运人对文件的保留 (DGP/29-WP/22 号文件)

2.2.2.1 用于证明提交空运的特定危险物品危险性类别的信息可能对事故或征候事件的调查很重要, 但往往已无法获得。《技术细则》要求保留某些文件 (如危险物品运输文件), 但不包括与分类有关的文件。DGP-WG/23 会议提议对第 2 部分关于分类规定的引言章进行修订, 要求托运人保留信息或文件, 以证明其提交空运的危险物品的分类依据。还提议对第 5 部分 4.4 中保留危险物品运输信息的规定进行修订, 要求必须应要求向国家有关当局提供这些信息 (见 DGP-WG/23 会议报告第 4.2.2.3 段)。在 DGP-WG/23 会议上, 与会者对该提案的目标表示赞同, 但对第 2 部分的修订却很少有人表示支持。对于所查明的可用于证明分类依据并拟议作为例子列入第 2 部分 0.1 段注释内的信息类型, 存在若干反对意见, 特别涉及对安全数据表的提及。成员们认为, 这些信息并非用于运输目的, 对于分类而言无效。其他关切是, 明确要求保留文件会给托运人造成不必要的负担, 而且该提案会对多式联运产生影响。一些人认为指导材料将是实现这一意图的更好方法。

2.2.2.2 向 DGP/29 会议提交了一份经修改的旨在减轻托运人负担的修订, 要求托运人应要求向国家有关当局提供其用于指定分类的信息, 而不是明确要求保留文件。提案人认为在 DGP-WG/23 会议上表达的其他关切没有道理。他认为, 与提及安全数据表有关的关切是没有根据的, 因为修订只是将安

全数据表作为一个例子引用，并没有要求使用安全数据表。他认为安全数据表可能是有用的，并指出安全数据表的结构和内容都有标准可循。他认为对多式联运影响的关切没有道理，因为附件 18 明确规定各国对危险物品事故、征候事件和未申报/错误申报的危险物品进行安全调查。最后，他认为指导材料不能有效实现目标。因此，他请专家组审议经修订的提案。

2.2.2.3 有些人认为修订没有必要，有些人担心这会导致国家不合理地要求提供信息。认为修订没有必要的人指出，托运人有义务在遵规检查或调查期间提供证据。因此增加一项要求是多余的。其他人则指出他们的国家在获取信息方面存在困难，并认为拟议修订会有所帮助。没有人反对该提案，但许多人认为应对托运人提供信息的时限作出规定。会议同意了该修订，但须增列三个月的时限，在此期间可要求托运人在收到请求时提供信息，并须对注释作出一项编辑修改。

2.2.2.4 讨论中提出了一个供今后讨论的问题，即在托运人不是原始制造商的情况下产生分类不当的风险问题。近年来，由于供应链的复杂性，这种风险有所增加。除非托运人是原始制造商，否则他们可能不太了解其托运物品的相关危险性。他们往往依赖于材料安全数据表，而这些数据表对于分类而言并不可靠。需要采取措施，明确规定托运人有责任对货物进行正确分类，无论其在供应链中所处的地位如何。

2.2.3 删除特殊规定 A67、A123 和 A199 中的“放热危险性”的条件（DGP/29-WP/27 号文件）

2.2.3.1 特殊规定 A67、A123 和 A199 要求归其管辖的具有潜在放热危险性的特定物品必须做好运输准备，以防止短路现象和意外启动。会议同意删除“具有潜在放热危险性的”的提法，因为所有电池都需要做好保护以防止短路和意外启动，即使它们没有潜在放热危险性。删除这一措词还可以防止托运人错误解释案文，以为如果物品不具有潜在放热危险性，则不受特殊规定任何其他部分的约束。据报告，有些托运人就是这样理解的。这一题目是在 DGP-WG/23 会议上首次讨论的（见 DGP-WG/23 会议报告（DGP/29-WP/3）第 4.2.2.1 段）。

2.2.4 装有易燃气体的不可再充装气瓶的限值（DGP/29-WP/30 号文件）

2.2.4.1 《联合国规章范本》中要求不可再充装的压力贮器在充装易燃气体时水容量须小于或等于 1.25 升，但在《技术细则》4:4.1.1.9 对不可再充装气瓶和封闭式低温贮器的相关要求中没有这项要求。会议同意将这项要求添加到《技术细则》中。

2.2.5 在危险物品运输文件中增加含有放射性物质的包装件尺寸（DGP/29-WP/36 号文件）

2.2.5.1 会议同意作出一项修订，要求在危险物品运输文件上标明装有放射性物质的包装件尺寸。专家组成员认为这是一个有益的补充，因其为装载程序提供了便利。这已经是行业惯例，因此不会给行业增加任何不必要的负担。

2.2.6 重排关于报告未申报或错误申报的危险物品的段落 (DGP/29-WP/37 号文件)

2.2.6.1 建议对报告要求进行编辑修订，以明确区分以下两种报告要求，一种是在货物或邮件中发现的未申报或错误申报的危险物品的报告要求，另一种是在旅客或机组人员行李中或身上发现的危险物品的报告要求。虽然这两种情况都必须向发现地所在国报告，但在货物或邮件中发现的未申报或错误申报的危险物品也必须向运营人所属国报告。但据报告，运营人和国家工作人员错误理解了这些要求。会议同意了这一修订，但须作补充修订，删除一个多余的词。

2.2.7 拟议删除表 8-1 中的特殊规定 A164 (DGP/29-WP/40 号文件)

2.2.7.1 会议同意将特殊规定 A164 从其所属的物品中删除，并将特殊规定的文字改为“未使用”。该特殊规定要求电池、以电池为动力的设备和以电池为动力的车辆做好运输准备，以保护电池免于出现短路，并防止设备和车辆意外启动。对于其所属的大多数物品而言，这项特殊规定被认为是多余的，因为这些要求已经纳入包装说明或物品所属的另一项特殊规定中。唯一的例外是 UN 3171 — 以电池为动力的设备和以电池为动力的车辆。分配给该条目的包装说明，即包装说明 952，不包含任何要求防止设备和车辆意外启动的规定。会议也同意了在包装说明中增加这一要求的提议。

2.2.8 建议

2.2.8.1 根据上述讨论，会议拟定了以下建议：

建议 2/2 — 为应对航空特有的安全风险和所查明的异常情况对《危险物品安全航空运输技术细则》(Doc 9284 号文件)进行修订，以便纳入 2025—2026 年版

将报告附录 A 中确定为“为了管理航空特有风险而进行修订”所涉及的修订纳入《技术细则》中。

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- 议程项目 **2:** 管理航空特有的安全风险和查明异常情况 (编号: **REC-A-DGS-2025**)
- 2.3:** 如有必要, 拟定对《危险物品安全航空运输技术细则补篇》(Doc 9284SU 号文件) 的修订提案, 以便纳入 **2025—2026** 年版

专家组未发现在本议程分项目下需要对《危险物品安全航空运输技术细则补篇》(Doc 9284SU) 进行任何修订。

- 议程项目 2: 管理航空特有的安全风险和查明异常情况 (编号: REC-A-DGS-2025)
- 2.4: 如有必要, 拟定对《与危险物品有关的航空器事故征候应急响应指南》(Doc 9481 号文件) 的修订提案, 以便纳入 2025—2026 年版

2.4.1 危险物品专家组工作组 2023 年会议 (DGP-WG/23 会议) 制定的对应急响应指南中操作方法代号的修订 (DGP/29-WP21 号文件)

2.4.1.1 会议审查了因 UNCOE 所作决定而对《与危险物品有关的航空器事故征候应急响应指南》(Doc 9481 号文件) 中操作方法代号进行的修订。会议查明有必要区分无次要危险性的 UN 1835 — 氢氧化四甲铵水溶液条目和有毒性次要危险性的 UN 1835 — 氢氧化四甲铵水溶液条目。会议同意了相关修订, 但须进行一项修改, 以作出这一区分。

2.4.2 建议

2.4.2.1 根据上述讨论, 会议拟定了以下建议:

建议 2/3 — 为应对航空特有的安全风险和所查明的异常情况对《与危险物品有关的航空器事故征候应急响应指南》(Doc 9481 号文件) 进行修订, 以便纳入 2025—2026 年版

应按报告附录 C 中所示, 对《与危险物品有关的航空器事故征候应急响应指南》(Doc 9481 号文件) 进行修订。

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**APPENDIX TO THE REPORT ON AGENDA ITEM 2
(English only)**

PROPOSED AMENDMENT TO ANNEX 18

**INTERNATIONAL STANDARDS
AND RECOMMENDED PRACTICES**

CHAPTER 1. DEFINITIONS

...

Unit load device (ULD). ~~Any type of freight container.~~ A device for grouping and restraining cargo, mail and baggage for air transport. It is either an aircraft container, or a combination of an aircraft pallet with a net and an aircraft pallet net, or aircraft pallet with a net over an igloo. An aircraft ULD is designed to be directly restrained by the aircraft cargo loading system.

Note 1.— *An overpack is not included in this definition.*

Note 2.— *A freight container for radioactive material is not included in this definition (see Part 2, paragraph 7.1.3 of the Technical Instructions).*

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议程项目 3： 促进危险物品的安全航空运输（编号：REC-A-DGS-2025）

3.1 危险物品专家组工作组 2023 年会议（DGP-WG/23）商定的对技术细则第 7 部分的修订草案（DGP/29-WP/17 号文件）

3.1.1.1 会议审查了 DGP-WG/23 会议上商定的对《技术细则》的一项修订，该修订旨在为运输以锂离子电池为动力的代步工具提供便利。该修订引入了一项注释，澄清对于一直安装在代步工具中的锂电池没有瓦时限制。会议同意了这一修订。

3.2 将“独家使用”的概念扩展到航空器集装箱（ULDs）（DGP/29-WP/35 号文件）

3.2.1 会议同意在“独家使用”定义下增加一个注释，以澄清大型货运集装箱无需根据《国际集装箱安全公约》获得批准。作出这一修订是为了便利放射性物质独家使用货物的空运。“独家使用”的定义将运输限定为仅使用航空器或大型货运集装箱来运输。放射性物质的货运集装箱通常是经过认证的多式联运货运集装箱，其体积之大，以至于无法在大多数航空器上运载。仅使用航空器空运这些物质的成本使其实际上不可能实现。

3.2.2 这个问题最初是在 DGP-WG/22 会议上提出的，当时提出了一项修订，允许使用航空器集装箱来解决这个问题。工作组出于若干个原因不支持这项修订，其中一个原因是航空器集装箱可能不足以容纳某些剂量率非常高的放射性物质。工作组认为需要一个更有针对性的修订。提交给 DGP/29 次会议的原始修订更有针对性，但专家组无法予以支持，因为它提供了一种选择，即不按照独家使用来运输极少量的易裂变核素，这偏离了《国际原子能机构条例》和使用其他运输模式时允许运输的物质的规定。但在讨论过程中认识到，真正的问题是认为货运集装箱需要根据《国际集装箱安全公约》批准空运，该公约要求使用尺寸为 20 英尺或 40 英尺的多式联运集装箱。虽然《联合国规章范本》在其货运集装箱定义中纳入了这一要求，但《技术细则》却未予纳入。没有任何规定禁止使用较小的集装箱进行空运。专家组认为，增加一个注释，澄清大型货运集装箱不需要得到《公约》批准，是解决这一问题的更简单、更直接的方法。它不会对《国际原子能机构条例》或《联合国规章范本》产生影响，因为它是专门针对空运模式的。不过将向这两个机构通报这一修订。

3.3 旅客和机组携带的危险物品例外情况（DGP/29-WP/23 号文件）

3.3.1 会议审议了一项提议，即通过对表 8-1 中关于旅客和机组成员携带的危险物品的规定作出一项特殊规定，将《技术细则》视为例外的危险物品添加进去。有人提出应允许旅客和机组成员携带这些危险物品，条件是该例外不仅仅适用于仅作为货物运输的危险物品。然而，由于表 8-1 中未列出这些危险物品，它们往往被拒绝运载。表 8-1 下的注 2 规定，《技术细则》中规定的例外不会再次列入表 8-1 中，并列出了符合这一条件的两个具体项目。有人认为，不列出其他例外会导致它们被拒绝运输。

3.3.2 这一修订未获支持。成员们认为，在表 8-1 中增加条目与专家组关于保持表格简洁和不太具体的决定相矛盾。某些项目过去曾被列入表中，专家小组决定将其删除。成员们对这一意图表示理解，

但认为通过指导材料或在《危险物品专家组（DGP）帮助编制《技术细则》和辅助文件的指导材料》中解决所提出的问题更为合适。

3.3.3 会议同意了提议中包含的一项编辑修订。该修订将注 1 和注 2 从 8;1.1.10 之下移至 8;1.1.1 之下。注 1 列出了旅客在其他运输模式中可以携带的但禁止空运的某些危险物品，注 2 强调各国可以实施符合航空安保利益的额外限制。专家组认为，与 8;1.1.10 相比，这些注释更适用于 8;1.1.1 中的规定。

3.4 取消在根据包装说明 650 准备的包装件上填写托运人和收货人姓名的要求（DGP/29-WP/29 号文件）

3.4.1 按照包装说明 650 进行包装并划入 UN 3373 — B 类生物物质的包装件上必须标明托运人和收货人的姓名和地址。而使用机读代码来存储数据（包括客户和患者信息）的情况越来越多，并且在需要为患者保密的情况下变得至关重要。因此，提出了对包装说明 650 的一项修订，允许通过条形码或 QR 码等机读代码提供托运人和收货人的姓名和地址。虽然没有人反对这一提议，但有人指出，对于在书面文件或包装件上提供负责人姓名和电话号码的要求，没有提出同样的规定。这似乎不一致，因为考虑到负责人可能与托运人或收货人相同，这也可能影响到患者的保密性。然而，有人指出，负责人通常不是患者。因此，患者保密问题并不是一项关切。有人进一步询问，鉴于《联合国规章范本》中没有相应的要求，是否有必要提供任何信息。有人支持删除这些要求，但在下一个两年期将进一步考虑这个问题。对于装有干冰的包装件，需要注意确保的是，删除包装说明 650 中的要求不会被解释为当 UN 3373 与干冰包装在一起时不需要该信息。装有干冰的包装件须遵守《技术细则》的所有适用要求，包括在包装件上标明托运人和收货人姓名和地址的要求。

3.4.2 会议同意了这一修订。

3.5 对表 8-1 中携带供个人使用的医疗装置和电池的例外情况的澄清（DGP/29-IP/6 号文件）

3.5.1 旅客规定禁止携带危险物品，除非根据表 8-1 获准携带，且为个人使用。请会议考虑了这样一种例外规定，即医疗专家因紧急患者护理所需而携带含有锂金属或锂离子电池芯和电池的便携式电子医疗装置以及备用电池的情况不受个人使用要求的约束。救生医疗装置有时需要紧急送往患者身边，有时需要手提以确保装置在货物运输过程中不会损坏。有人担心运营人对“个人使用”一词的解释可能不一致，一些运营人可能不允许携带此类装置。作出例外规定可以防止这种情况发生。

3.5.2 会上尽管对这一意图表示同情，但也担心这一规定会被滥用，个别旅客可能会出于商业目的携带多件物品。规定物品必须供个人使用就是为了防止这种情况发生。之所以向专家组提出这一要求，是因为发生了一起涉及需要手提的医疗装置的具体事件。一些专家组成员不愿意根据一次事件来制定新的国际规章。其他成员则强调，有必要根据旅客规定，以安全而非最终用途为依据来确定允许携带的物品。成员们认为，这个问题可以通过运营人批准来解决，但文件的作者指出，一些运营人不愿意违背《细则》中的规定，因为担心国家会将其视为不遵守规定。

3.5.3 没有提出正式提议。专家组成员愿意在下一个两年期内讨论这一问题。

3.6 建议

3.6.1 根据上述讨论，会议拟定了以下建议：

**建议 3/1 — 为了运输便利化而对《危险物品安全航空运输技术细则》
(Doc 9284 号文件) 进行修订，以便纳入 2025—2026 年版**

将报告附录 A 中确定为“为了运输便利化而进行修订”所涉及的修订纳入《技术细则》中。

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议程项目 4： 管理航空载运锂电池带来的安全风险（编号：工作卡 DGP.003.04）

4.1 审议 DGP/28 会议提出的关于降低锂离子电池的荷电状态要求的修订（DGP/29-WP/6 号文件）、危险物品专家组储能装置工作组（DGP 储能装置工作组）的报告（DGP/29-WP/41 号文件）、危险物品专家组储能装置工作组（DGP 储能装置工作组）的报告：领结图分析（DGP/29-IP/1 号文件）、危险物品专家组储能装置工作组（DGP 储能装置工作组）的报告：系统理论过程分析（STPA）（DGP/29-IP/2 号文件），以及危险物品专家组储能装置工作组于 2023 年 11 月 9 日和 10 日以及 2023 年 11 月 14 日召开的现场会议的报告（DGP/29-IP/9 号文件）

4.1.1 DGP/28 会议审议了一项提案，将 UN 3480 — 锂离子电池在荷电状态不超过其额定容量 30% 的情况下交运的现有要求扩展到 UN 3481 — 与设备包装在一起的锂离子电池、UN 3481 — 装在设备中的锂离子电池、UN 3171 — 以电池为动力的设备和 UN 3171 — 以电池为动力的车辆。虽然有些人支持扩大现有荷电状态限制的适用范围，尤其是对于与设备包装在一起的锂电池，但专家组在没有首先进行彻底的安全风险评估的情况下无法达成共识。然而在 DGP/28 会议期间，由于时间限制，无法完成此项工作。专家组同意，应在 DGP/28 会议之后由 DGP 储能装置工作组开展这项工作，并且鉴于此项任务的复杂性，应通过与秘书处协调，在安全管理专家的指导下进行安全风险评估。在 DGP/29 会议之前的整个两年期内，DGP 储能装置工作组与国际民航组织安全管理专家举行了虚拟会议，并在 DGP-WG/22、DGP-WG/23 和 DGP/29 会议上举行了现场会议。其工作成果已提交 DGP/29 会议，概述如下。

4.1.2 安全风险评估

4.1.2.1 DGP 储能装置工作组的评估重点是与设备包装在一起的锂电池和装在设备中的锂电池，因为已经对其制定了类似的缓解措施。专家组单独审议了降低车辆荷电状态的要求（见本报告第 4.2 段）。

领结图

4.1.2.2 工作组绘制了领结图，以直观显示危险源（航空器上运输的锂电池）、危险源的失控（热失控）、《技术细则》中旨在防止热失控事件的现行要求，以及减轻热失控事件后果的措施。这些图表载于本议程项目的附录 A。应通过电子方式查看这些图表，以便于将其放大观看。

系统理论过程分析（STPA）

4.1.2.3 在完成领结图之后，DGP 储能装置工作组将重点转移到安全风险分析上。由于锂电池运输系统的复杂性和可用数据的有限性，基于可能性和严重性来评估风险的传统方法被证明具有挑战性。因此无法以可接受的准确度来预测可能性。传统方法还假定，通过观察过去的行为可以准确预测未来的行为。然而，由于技术变化速度很快、且有新的系统加入者，以及监管环境不断变化，使得预测未来行为并不可靠。因此，秘书处的安全管理专家建议采用另一种风险评估做法，即系统理论过程分析（STPA）来评估系统的安全性。

4.1.2.4 系统理论过程分析方法将重点放在预防损失方面而不侧重于概率，有助于克服传统方法的许多局限性。工作组确定的损失包括航空器损失、人员伤亡、货物损失、对航空运输系统失去信心以及失去有效运输锂电池的手段。确定损失是系统理论过程分析流程中四个步骤中的第一步。接下来的步骤是对现有锂电池运输系统进行建模，查明可能导致损失的不安全行为，并查明这些行为发生的原因。一旦工作组完成了这四步流程，就可确定现有的和潜在的新缓解措施，并将每项措施的强度按“缓解效果评分”从 1 到 4 进行排序，其中 4 分为最有效措施。旨在通过设计消除风险或降低风险的缓解措施，比那些只提供警告或依靠程序和培训的措施排名靠前。工作组系统理论过程分析的详细内容，包括缓解措施清单及其有效性评分，见本议程项目报告附录 B（仅有英文版）。

数据

4.1.2.5 审查了保险商实验室公司（“UL”）通过其自愿热失控事件方案（TRIP）在 2017 年至 2023 年期间收集的数据摘要。22 家航空运营人（大多为美国运营人）通过自愿向系统提供数据的方式参与了该方案。这些数据基于 715 起热失控事件。数据显示，自 2017 年以来，涉及不带设备包装的锂离子电池的事件有所减少。对此的一个假设是，禁止在客机上运输锂电池的规定以及要求在货机上运输的 UN 3480 — 锂离子电池交运时的荷电状态为 30% 的规定产生了积极影响。涉及装在设备中的锂离子电池和与设备包装在一起的锂离子电池的事件在 2020-2021 年达到最低点，但此后一直在增加。2022 年，由于 UN 3481 货物事件的增加，按每收入吨英里和每次出发计算的货运事件率都有所上升。

4.1.2.6 审查了与 UN 3480、UN 3090 和 UN 3481 货运量有关的数据。这些数据基于从美国人口普查局贸易数据中提取的美国进出口数据。这些数据确定了通过空运从国外某点运往美国某点或者从美国某点运往国外某点的产品的货值、重量和数量。根据这一数据估计，2015 年至 2022 年期间，空运进出美国的 UN 3481 货物（不包括国内货物）数量从 185.3 万件增至 301.3 万件。

分析 DGP/28 会议上提出的关于将荷电状态限制的适用范围扩大到与设备包装在一起的锂离子电池和装在设备中的锂离子电池的意见

4.1.2.7 对 DGP/28 会议上提出的意见进行了分析，目的是记录事实和未知变量。详细分析见本议程项目报告附录 C（仅有英文版）。

4.1.3 安全风险评估结果

4.1.3.1 专家组根据所有现有信息，审议了关于与设备包装在一起的锂离子电池和装在设备中的锂离子电池的相关空运风险是否得到充分缓解。

与设备包装在一起的锂离子电池

4.1.3.2 专家组得出结论认为，符合包装说明 966 第 I 节要求的与设备包装在一起的锂离子电池的相关风险没有得到充分缓解。第 I 节中没有能量容量限制，因此专家组得出结论，要求所有交运电池的荷电状态不超过其额定容量的 30% 是合理的。包装说明 966 第 II 节规定，锂离子电池芯的瓦时额定值为 20 瓦时，锂离子电池的瓦时额定值为 100 瓦时。试验表明，2.7 瓦时以下的电池芯和电池造成的危险微乎其微。因此，专家组得出结论，瓦时额定值不超过 2.7 瓦时的电池芯和电池的相关风险已得到充分

缓解，对于瓦时额定值超过 2.7 瓦时的电池芯和电池，要求交运电池的荷电状态不超过其额定容量的 30% 是合理的。

4.1.3.3 专家组同意增加一项规定，允许经始发国和运营人所属国批准，根据这些国家主管部门规定的书面条件，以较高的荷电状态运输与设备包装在一起的锂离子电池。一些人预计会有大量的审批申请，这可能会对各国产生很大影响。这反过来又会影响供应链和货物流通。业界表示有必要简化流程，建议由运营人通过自己的安全风险评估进行批准即可。然而，专家组成员一致认为需要有运营人所属国和始发国的监督，他们虽然对这些挑战表示同情，但也希望确保审批申请不会变成仅仅为了满足商业需要的正常商业做法。各国也可以通过审批程序获得有价值的信息。会上一致认为，有必要制定专门针对锂电池的批准发布指南，并应将其纳入正在制定的关于发布批准和豁免的一般性指南，以支持实施对附件 18 的拟议修订（见议程项目 5 的报告）。

4.1.3.4 专家组同意，在这项规定成为强制性规定之前，应提供 12 个月的过渡期，以使行业有时间调整其流程。有人对是否有此必要提出质疑，但也认识到，催促行业匆忙改变其流程可能会带来安全风险。几位成员倾向于采纳较短的过渡期，理由是存在安全风险，而且在对 UN 3480 — 锂离子电池规定荷电状态要求时，并没有提供 12 个月的过渡期。然而有人指出，改变流程以降低与设备包装在一起的电池的荷电状态远为复杂，因为涉及的实体比 UN 3480 所涉及的电池或电池芯制造商要多得多。尽管在为其他规定提供过渡期时，三个月是标准期限，但这是为了适应文件、标记和标签的变化。荷电状态限制则要求改变制造流程，这要复杂得多。

4.1.3.5 专家组认为，了解为什么需要规定荷电状态限制，将使托运人更有可能遵守规定，也更有可能交运荷电状态低于其额定容量 30% 的锂电池芯或电池。因此，在关于确定额定容量指南的注释中添加了文字，指出在降低荷电状态下运输的电池芯和电池较为不易发生热失控。该注释也添加到包装说明 965 第 I 节和第 IB 节中现有荷电状态要求下的注释中。

4.1.3.6 专家组几乎一致同意修订包装说明。一位专家组成员不支持强制要求降低荷电状态。他认为没有足够的数据来证明强制实施一项会对社会产生重大影响措施是合理的。他认为专家组需要根据事件发生的可能性做出决定，而这一点尚未确定。他认为，近年来的技术进步提高了安全性，可以通过替代缓解措施进一步确保安全。

装在设备中的锂离子电池

4.1.3.7 专家组同意建议，符合包装说明 967 第 I 节或第 II 节要求的装在设备中的锂离子电池应在荷电状态不超过其额定容量 30% 的情况下交运。专家组同意添加与包装说明 965 和 966 所添加的相同注释，提及关于确定额定容量的指南，并指出在降低荷电状态下运输的电池芯和电池较为不易发生热失控（见上文第 4.1.3.5 段）。一些专家组成员认为，针对与设备包装在一起的锂离子电池所商定的强制性缓解措施也应适用于装在设备中的锂离子电池。大多数人只能支持制定建议，因为他们认为风险没有高到需要作出强制规定的地步，因为这将对行业产生重大影响，并阻碍某些需要在充满电的情况下运输的设备进行空运，这些设备包括救生医疗装置、内嵌锂离子电池的大型信息技术设备和军事设备。他们认为，由于设备提供的保护和较小的能量密度，装在设备中的电池比单独包装的电池构成的风险更小。他们认为所提供的数据不具有相关性，也不足以证明有必要提出要求。他们认为，这些事件主

要是由于不合规的装运造成的。一名反对作出强制性要求的成员还对引入一条建议提出了关切，指出“应该（should）”一词在某些语言中被解释为一项要求。其他成员不认为这一论点是合理的，因为在附件 18 和所有其他附件的前言中已明确规定，“应该”是建议措施的执行动词。支持制定要求的人则是基于系统理论过程分析（STPA）的结果和 DGP/28 会议上提出的论点。他们认为这些数据具有相关性，等待更多数据是一种被动的做法。航空器货舱中的任何火灾都是一种风险，而且有文件证据表明在航空运输系统内，与设备包装在一起或装在设备中的电池引起过火灾。由于存在各种变数，要准确判断发生事件的可能性是不可能的。正是出于这一原因，才选择了系统理论过程分析做法。不过，他们认为一项建议是朝着正确方向迈出的一步。与会者一致支持继续评估与锂电池相关的风险，共享信息，并根据新信息调整专家组的决定。

补充缓解措施

4.1.3.8 专家组审议了系统理论过程分析进程期间确定的除了限制荷电状态之外的潜在缓解措施（见本议程项目报告附录 B 表 6）。会议同意提请即将召开的联合国小组委员会会议注意若干项包含多式联运内容的措施，随后如果小组委员会认为合适，将在下一年提出对《联合国规章范本》的正式修订提案。一些缓解措施将涉及与万国邮政联盟（UPU）的协调。可以通过国际民航组织和万国邮联联络委员会的工作实现这一协调。其他措施包括由专家组制定指导意见，纳入用以支持实施附件 18 修订的材料中。

4.1.3.9 除了荷电状态限制以外，专家组可在 2025-2026 年版《技术细则》中引入的一项措施是增加一条要求，即不在联合国包装件性能试验范围内的包装件必须能够承受堆码试验（即根据包装说明 966 和 969 第 II 节装运的与设备包装在一起的锂电池，以及根据包装说明 967 和 970 第 I 节或第 II 节装运的装在设备中的锂电池）。该措施旨在确保包装足够坚固，以防止包装件内的电池芯或电池受损。之所以有必要引入这一措施，是因为发生了一起移动电话等待装机时在停机坪上起火的事件，专家组第二十八次会议上讨论了这起事件（见 DGP/28 会议报告第 4.2 段）。没有证据表明存在不合规情况，包括不符合联合国《试验和标准手册》中的设计型号试验要求的情况。移动电话是堆放在一个托盘上，堆放高度约有两米，人们认为，堆放在最上面的其他包装件所施加的力可能对其造成了损坏。要求进行三米堆码试验与《细则》第 3.5 部分对限制数量运输的危险物品要求是一致的。一名成员反对增加这一要求，因其担心专家组没有充分考虑到这一要求对行业的影响，但这主要是因为对这一要求的预期实施方式有误解。要求包装能够承受三米堆码试验。“能够承受”一词在其他规定中也得到使用，包括适用于 UN 3363 — B 类生物物质的包装说明 650。根据联合国小组委员会进行的广泛讨论，在包装说明 650 中增加了一条注释，说明可以通过试验、评估或经验来证明承受力，以澄清只要托运人通过评估或经验确定了承受力，则不要求对每个包装件进行试验。专家组同意在包装说明 967 和 970 的第 I 节和第 II 节以及包装说明 966 和 969 的第 II 节中增加一项要求，要求包装件能够承受三米的堆码试验。在该要求下增加了一条注释，说明可以通过试验、评估或经验来证明其承受力。在包装说明 965 和 968 第 IB 节中关于包装件必须能承受三米堆码试验的现有要求下，也增加了这条注释。

4.1.4 结论

4.1.4.1 专家组对 DGP 储能装置工作组报告员、其顾问和工作组成员表示感谢。他们开展了大量工作。这促进了 DGP/29 会议的讨论，无疑也将促进专家组今后的讨论。

4.2 降低由锂离子电池为动力的车辆的荷电量（DGP/29-WP/26 号文件，增编）

4.2.1 专家组同意在表 3-1 中增加以下新条目：UN 3556 — 以锂离子电池为动力的车辆、UN 3557 — 以锂金属电池为动力的车辆和 UN 3558 — 以钠离子电池为动力的车辆，并通过议程项目 1 下的与联合国协调统一的程序，为这些条目指定包装说明 952。新条目得以区分由不同类型电池为动力的车辆，因此能够应用更具体的风险缓解措施。对用于驱动车辆的电池的能量容量或质量没有限制。如果以 100% 的荷电状态运输，热失控事件的后果可能会很严重。因此，建议对包装说明 952 进行修订，要求划入这些条目的车辆尽可能将电池放电，同时允许剩余的指示行驶里程或电池容量不超过 25%。剩余容量可使车辆依靠自身动力行驶，以便于装卸。根据大型汽车制造商代表提供的信息，油量计上显示的 25% 的行驶里程或电池容量相当于大约 30% 至 35% 的荷电状态。

4.2.2 该修订最初是在 DGP-WG/23 会议上提出的，但只针对 UN 3556，不过由于专家组一些成员表示的关切，修订未获同意（见 DGP-WG/23 报告第 4.4.1.1 段）。这些专家组成员认为，鉴于专家组在进行安全风险评估之前不会同意 UN 3481 — 装在设备中的锂离子电池的荷电状态限制，因此没有理由在未进行安全风险评估的情况下实施降低荷电量的要求。这些专家组成员认为，以锂电池为动力的小型车辆相当于装在设备中的电池。其他成员则认为，有充分证据表明由充满电的以锂离子电池为动力的车辆所带来的风险，包括至少有两起无法控制的船上火灾，涉及安装在车辆中的锂离子电池，其中一艘船在海上失踪。不过，对于瓦时额定值不超过 100 瓦时的装在设备中的锂电池，专家组将其与瓦时额定值更高的锂电池予以区别对待，因为专家组认为前者造成的风险较小。较小的锂电池不在《技术细则》大部分规定的范围内。因此，专家组的几位成员认为，对于由这些较小电池为动力的车辆，有理由不适用荷电限制。

4.2.3 向 DGP/29 会议提出了一项经修改的提案，即只要求瓦时额定值超过 100 瓦时的电池满足降低荷电量要求。经修改的修订还将这一要求适用于 UN 3557 — 以锂金属电池为动力的车辆和 UN 3558 — 以钠离子电池为动力的车辆。经修改的修订得到普遍支持，但并非所有人都认为交运瓦时额定值不超过 100 瓦时的以电池为动力的车辆应仅作为一项建议。专家组已经支持针对 UN 3481 — 装在设备中的锂离子电池降低荷电状态的建议，但这样做的理由是需要运输某些充满电的设备（包括救生医疗装置），但车辆没有这种需要。赞成者指出，认为装在设备中的电池比单独包装的电池风险小也是理由之一，这也适用于装在车辆中的电池。他们支持降低装在车辆中的较大型电池的荷电要求，但不支持降低装在设备中的电池的荷电要求，因为对装在车辆中的电池质量没有限制，而对装在设备中的电池质量则有限制。

4.2.4 专家组同意所提出的修订，并增加了以下修改内容：

- a) 提供一种选择办法，用于交运电池指示容量不超过 25% 或电池荷电状态不超过额定容量 30% 的车辆。在原始提案中，指示电池容量不超过 25% 是唯一的方法，因为这被认为更切实可行，但情况并非总是如此。因此，专家组得出结论，应提供一种选择办法；
- b) 规定当电池是可充电电池时，适用 UN 3557 — 以锂金属电池为动力的车辆要求。
- c) 允许以瓦时额定值超过 100 瓦时的电池为动力的车辆，根据始发国和运营人所属国主管部门规定的书面条件，经始发国和运营人所属国批准，以较高的荷电状态交运；和

- d) 允许十二个月的过渡期，与 UN 3481 — 与设备包装在一起的锂离子电池所商定的过渡期相一致（见本报告第 4.1 段）。

4.3 修订包装说明 952 以纠正发布失误（DGP/29-WP/32 号文件）

4.3.1 在 DGP/28 会议上商定了对电池为动力的车辆或设备的包装说明中所载锂电池规定进行一项修订，以消除在对车辆或设备中未经试验的电池类型进行运输方面的审批程序所涉国家的不一致之处（参见 DGP/28 报告第 4.12 段）。2021—2022 年版《技术细则》中的包装说明要求获得始发国相应国家主管部门的批准，而特殊规定 A88 则要求获得始发国和运营人所属国的批准。DGP/28 会议同意对该包装说明进行修订，以与特殊规定 A88 保持一致。但是，在 DGP/28 会议报告中，包装说明 952 中的原始案文无意中未被删除，现在出现在 2023—2024 版的阿拉伯文、中文、英文和俄文版本中。会议同意作出一项修订，以纠正这一失误。

4.4 澄清纳入表 8-1 的新的例外（DGP/29-WP/39 号文件）

4.4.1 DGP-WG/23 会议上提出了表 8-1 中一项新例外可能引起的误解情况，该例外允许旅客和机组人员携带装有电池的已激活装置，其中锂金属电池的锂含量不超过 0.3 克，锂离子电池的瓦时额定值不超过 2.7 瓦时（见 DGP-WG/23 报告第 4.4.1.6 段）。一种解释是这些限制适用于装置，另一种解释是这些限制适用于装置内含的每个电池。大多数成员同意，这些限制适用于整个装置，而不是已激活装置的单个电池芯或电池。有成员建议，鉴于旅客行李中可能有无限数量电池的装置处于激活状态，因此有必要作出澄清，如果限制被视为适用于单个电池。允许装置保持激活状态是为了满足旅客和机组人员在托运行李中运载由小型锂电池供电的已激活跟踪装置的特定需求。专家组决定允许已激活装置的依据是，数据显示在规定的限制条件下，电池发生热失控的后果较低，评估是基于总能量容量作出的。

4.4.2 有人提议在表 8-1 的规定下加一个注释，说明限制适用于装置，而不是单独适用于装置内含的每个电池。然而，有人担心这会被解释为适用于所有装置，而不仅仅是那些保持激活的装置。表 8-1 中关于锂电池（包括便携式电子装置）的其他规定适用于装置不工作时该装置内含的每个电池。没有人反对经修改的修订，该修订在实际条文中纳入了澄清内容。

4.4.3 虽然没有人反对该修订，但有一种立场认为，对装置施加限制与《联合国规章范本》规定的关于多式联运的一般分类原则相矛盾，该原则将瓦时额定值和锂金属含量与单个电池芯或电池相挂钩。他注意到，DGP-WG/23 报告指出，专家组成员同意这些限制适用于整个装置，而不是单个电池芯或电池，但他的立场并非如此。鉴于大多数人支持这一修订，他不反对修订，但希望在报告中记录这一立场。

4.4.4 会议同意了经修改的修订。

4.5 关于研究项目（欧洲航空安全局）现状的信息（DGP/29-WP/IP/10 号文件）

4.5.1 会议听取了欧洲航空安全局（EASA）研究活动的最新情况介绍，概述如下：

- a) 机上便携式电子装置引起的火灾风险，重点放在货物方面。这包括为改进和验证 SAE 锂电池包装件性能标准而进行的试验，评估和确定防止电池卷入外部货物火灾的额外缓解措施，以及为运营人进行锂电池货物运输风险评估而制定指南。最终报告可在以下网站公开获取：<https://sabatair.vito.be/en/reports>。
- b) 托运行李中便携式电子装置的安全航空运输。该项目的主要目标是评估货物灭火系统处理托运行李中电池供电装置引发的热失控事件的有效性。该项目于 2021 年 9 月启动，预计于 2024 年第二季度完成。相关信息公开载于以下网站：<https://www.easa.europa.eu/en/research-projects/fire-risks-caused-peds-board-aircraft>。
- c) 便携式电子装置 — 锂电池在客舱内起火/冒烟的风险。该项目的主要目标是提高飞行中使用便携式电子装置的安全性。项目于 2022 年 8 月启动，预计于 2025 年第三季度完成。相关信息可在以下网站公开获取：<https://www.easa.europa.eu/en/research-projects/LOKI-ped-lithium-batteries-firesmoke-risks-cabin>；和
- d) 利用安检设备检测锂电池。该项目的主要目标是评估使用机场安检设备和流程检测托运行李中锂电池的可行性。该项目于 2022 年 12 月启动，预计于 2024 年第二季度完成。相关信息可在以下网站公开获取：<https://www.easa.europa.eu/en/research-projects/detection-lithium-batteries-using-security-screening-equipment>。

4.5.2 一名专家组成员注意到欧洲航空安全局正在开展的关于安保措施对安全影响的另一个项目。该项目的主要目的是了解安全与安保之间相互依存的性质和程度，以评估安保措施对安全的影响。相关信息可在以下网站公开获取：<https://www.easa.europa.eu/en/research-projects/impact-security-measures-safety>。

4.5.3 专家组对欧洲航空安全局的介绍及其正在进行的研究表示赞赏。

4.6 建议

4.6.1 根据上述讨论，会议拟定了以下建议：

建议 4/1 — 对锂电池规定进行修订，以便纳入 2025—2026 年版《危险物品安全航空运输技术细则》（Doc 9284 号文件）

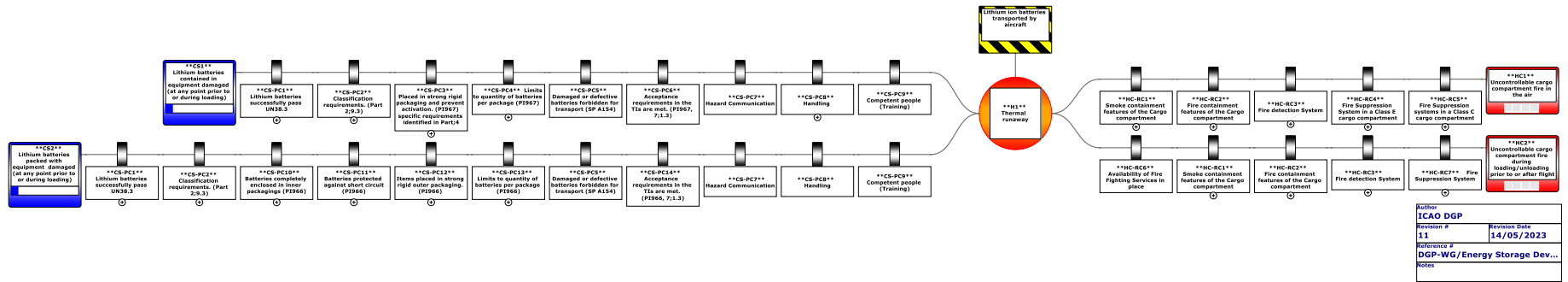
将报告附录 A 中确定为“对锂电池规定进行修订”所涉及的修订纳入《技术细则》中。

—————

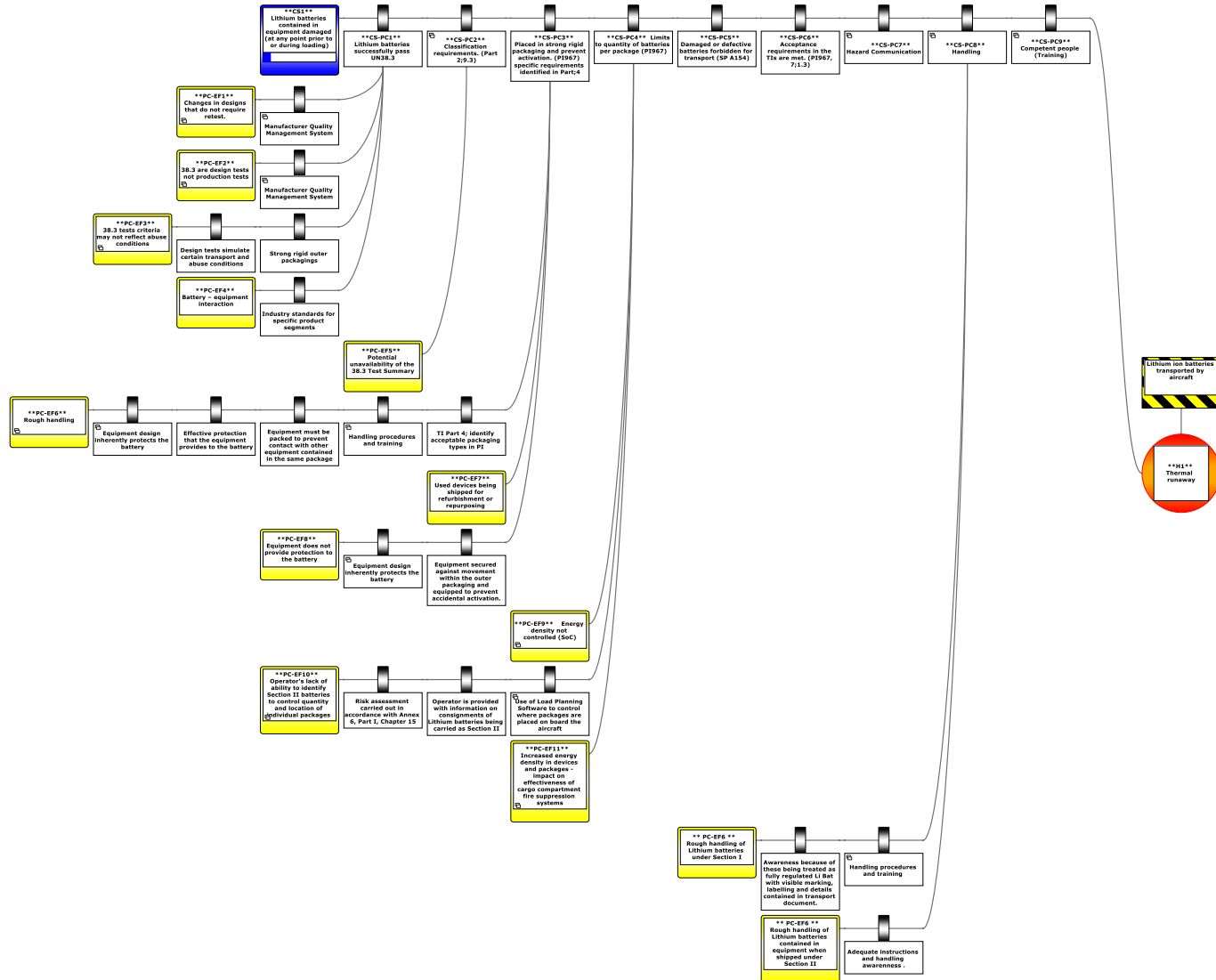
**APPENDIX A TO THE REPORT ON AGENDA ITEM 4
(English only)**

BOW TIE DIAGRAMS

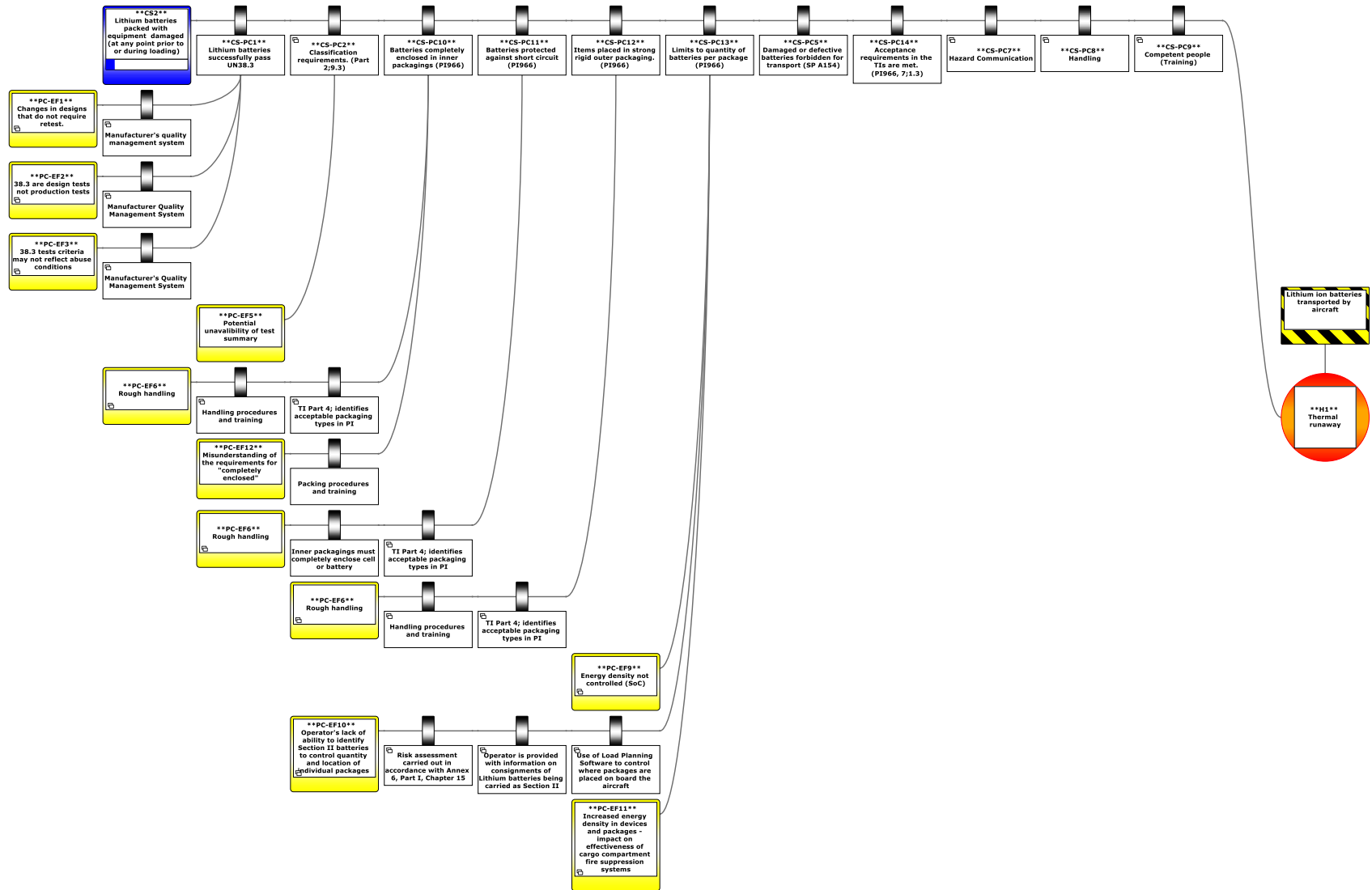
VIEW #1 — BOWTIE CS AND HC



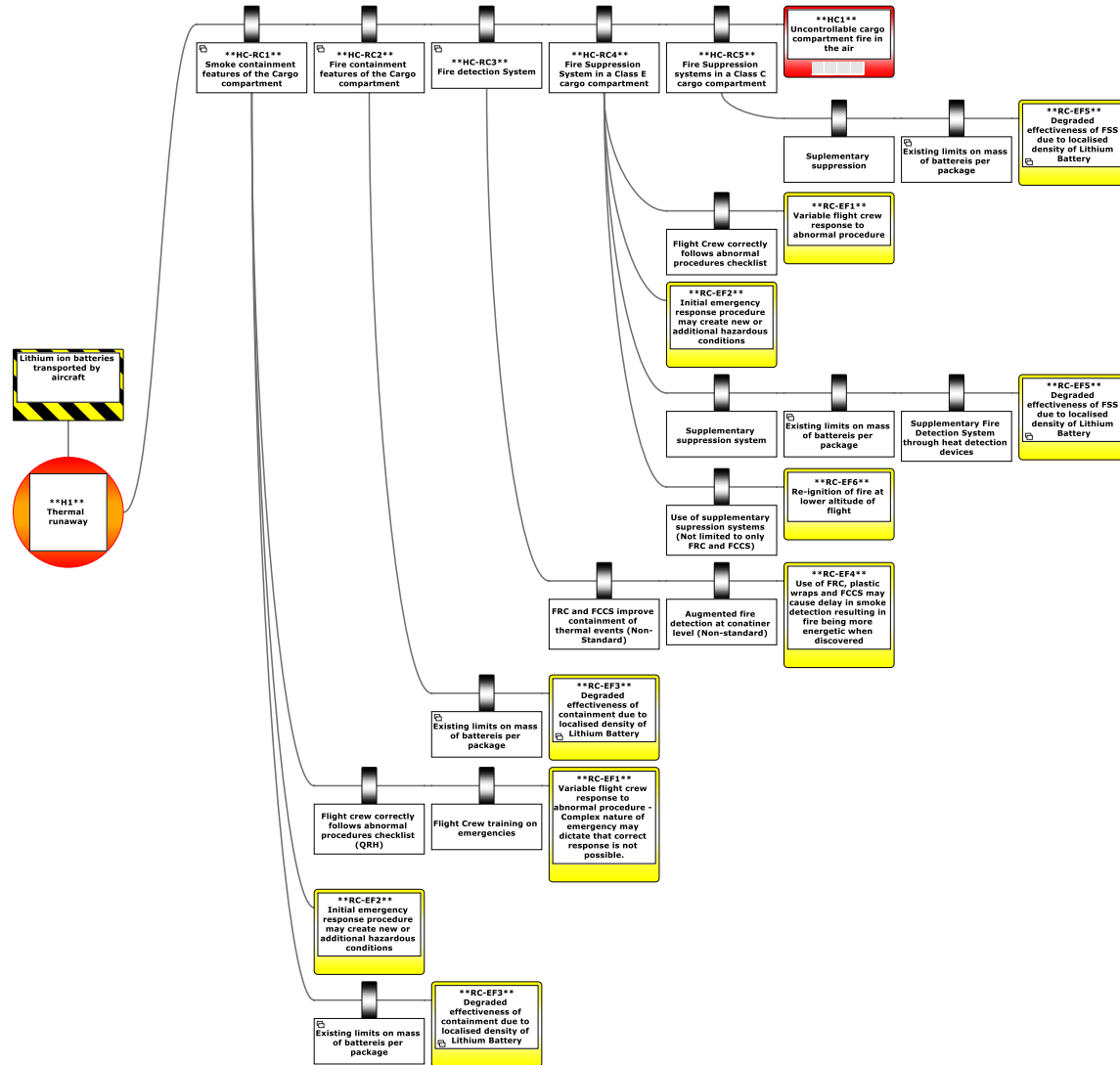
VIEW # 2 — THREATS AND CONTROLS CS1



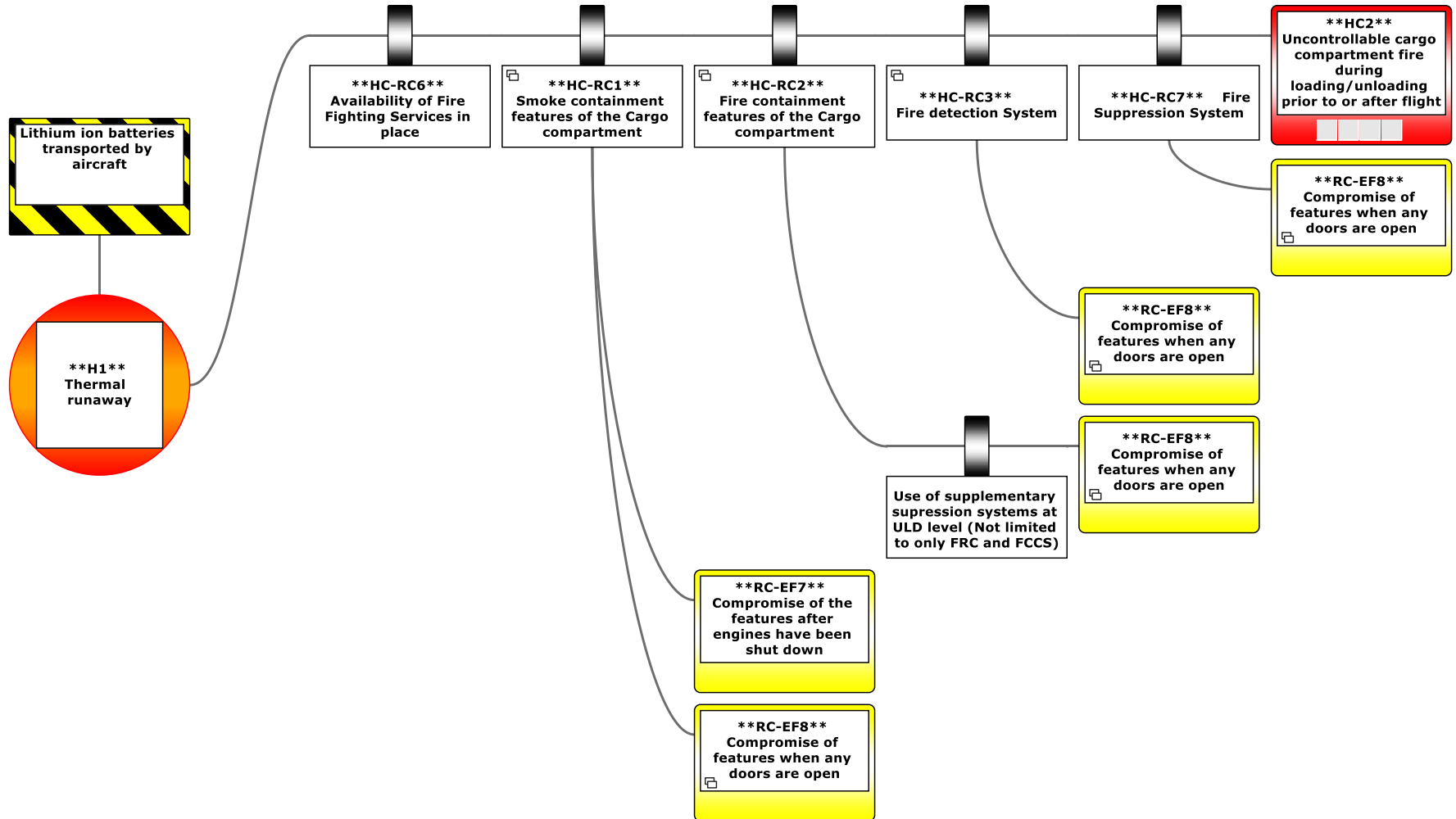
VIEW #2 – THREATS AND CONTROLS CS2



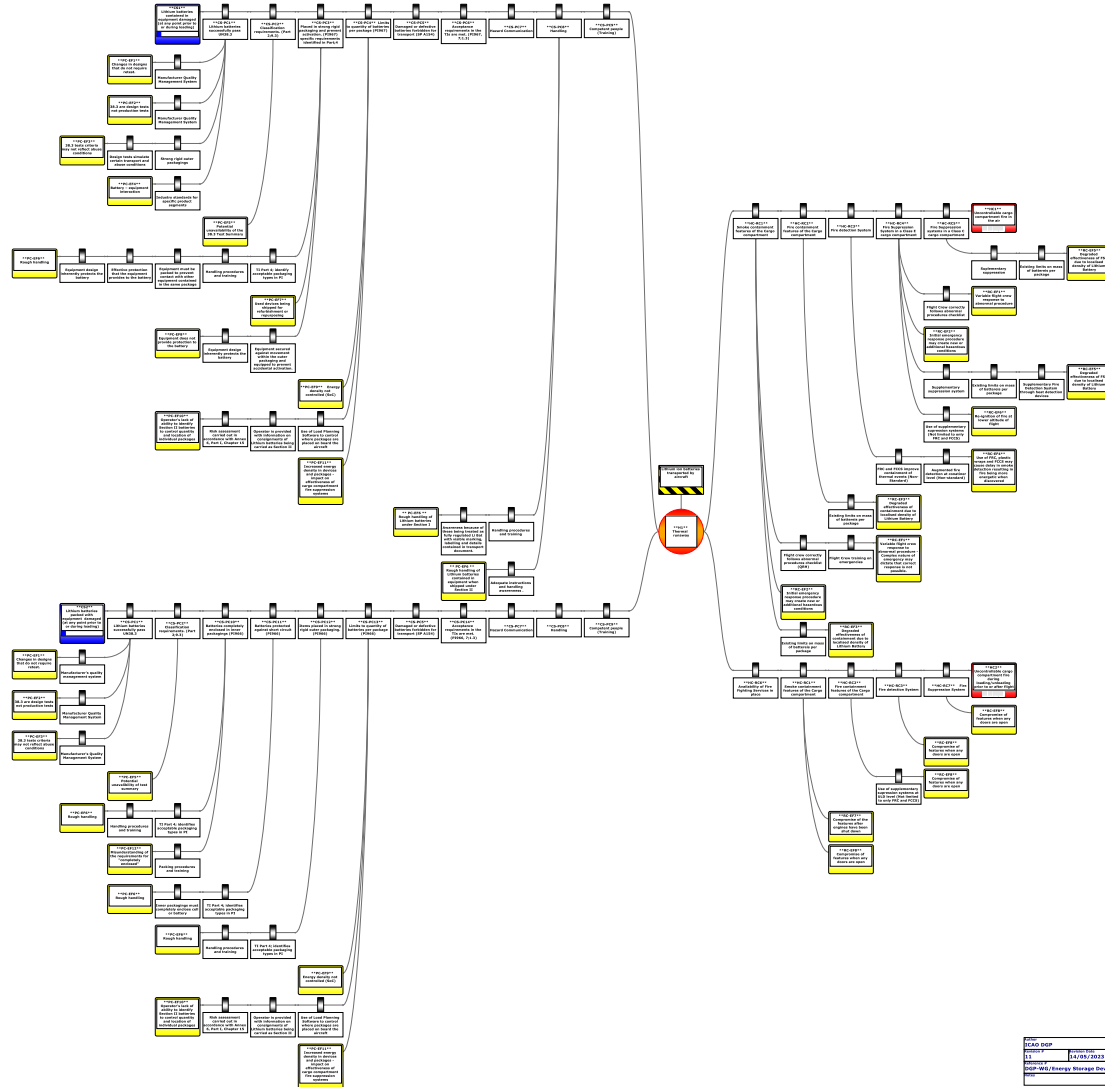
VIEW #3 – CONSEQUENCE HC1



VIEW #4 – CONSEQUENCE HC2



VIEW #5 – FULL BOWTIE



**APPENDIX B TO THE REPORT ON AGENDA ITEM 4
(English only)**

**REPORT OF THE SYSTEMS THEORETIC PROCESS ANALYSIS OF
LITHIUM BATTERY TRANSPORT**

1. INTRODUCTION

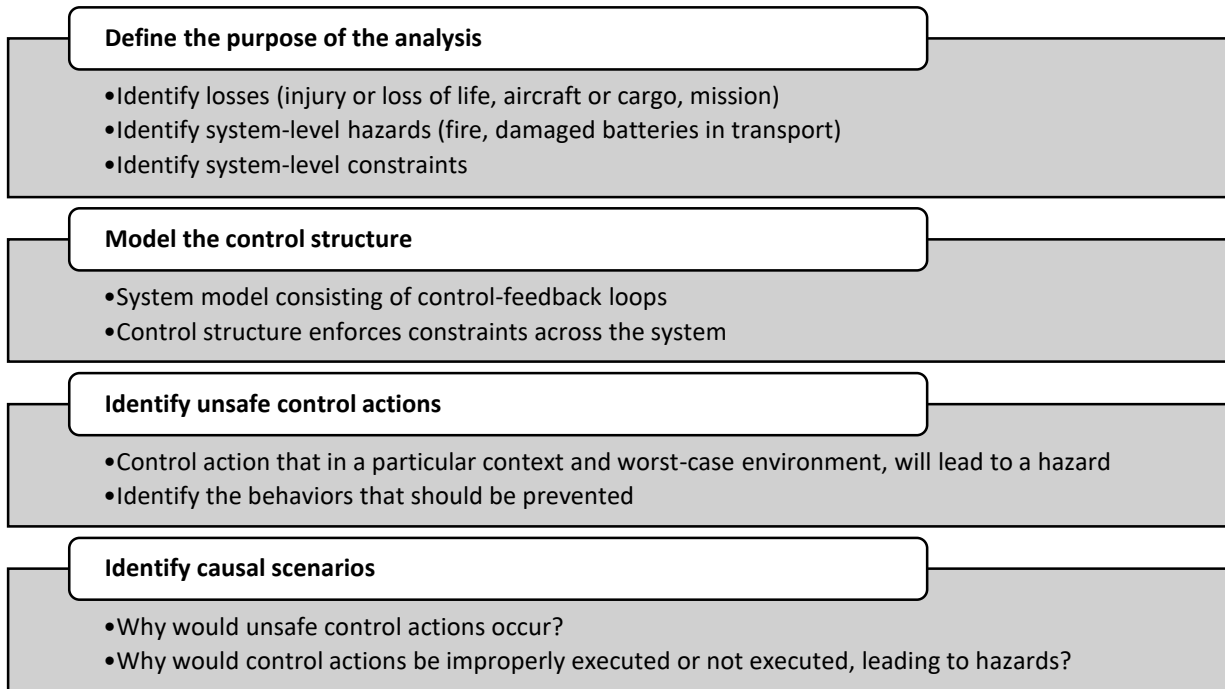
1.1 Overview and organization of the report

This report applies the systems theoretic process analysis (STPA) method to the air transport of lithium ion batteries packed with and contained in equipment. Section 2 explains the basic STPA method and introduces a means to rank the strength of potential mitigations. Sections 3, and 4 apply STPA to explore the safe carriage of lithium ion batteries and lithium ion battery powered equipment by air. Section 5 details analysis conclusions and potential future work. The attachment provides detailed tables that identify controller responsibilities, various unsafe control actions, causal scenarios and definitions of terms used in this report.

2. METHODOLOGY

2.1 STPA

The STPA method starts from a stakeholder prioritized list of system losses, followed by identifying high level hazards (system states) that can lead to those losses. Causal scenarios (including non-failures) that lead to hazards are considered. Identifying causal scenarios that do not involve failures but nevertheless result in hazardous conditions is an important feature of STPA and could encourage healthy scepticism of our knowledge of the system and promote decisions not only on what we know, but what we do not know. The basic STPA method involves (4) four steps.



Following completion of Step 4, mitigation measures can be identified and discussed in view of whether measure(s) prevent, reduce, or mitigate unsafe control actions (UCAs) or the occurrence of causal scenarios that lead to system hazards. In this case the strength of mitigation measures could be ranked based on a hierarchy where controls that prevent the occurrence of a UCA through system design are especially powerful, followed by controls that mitigate UCAs, followed by controls that increase detection of UCAs and controls involving additional procedures and training.

2.2 Mitigation effectiveness

The Technical Instructions identify the acceptability of lithium ion batteries and battery powered devices for transport by air and under what conditions. As such, the Technical Instructions include many requirements intended to prevent and mitigate these causal scenarios. As previously discussed, standard risk assessment methods and risk matrix are not well suited to examining lithium battery transport safety. Leveson, 2019 suggests using STPA and replacing hazards for failures and redefining likelihood based on the strength of potential controls. The relationship between individual failures and incidents is rarely obvious and it is nearly impossible to reliably assess the likelihood of future incidents based on previous experience. To overcome these obstacles the group utilized a mitigation order or precedence scale consistent with MIL-STD-882 and various other safety standards. Mitigations that design for minimum risk or eliminate the risk are ranked higher than those mitigations that provide only warnings or rely on procedures and training.

Table 1. Mitigation level order of precedence

Mitigation level	Mitigation description	Mitigation effectiveness score
Design for minimum risk	The causal factor can be eliminated through design to eliminate risks.	5
Reduction through design	If the identified risks cannot be eliminated, reduce it to an acceptable level through design selection e.g., safety design features or safety devices. The occurrence of the casual factor can then be reduced or controlled through system design (proactive)	4
Provide warning devices	When neither design nor safety devices can eliminate identified risks or reduce risk, devices shall be used to detect the condition and to produce an adequate warning signal. The causal factor can be detected and requires a response to mitigate (reactive).	3
Develop training and procedures	Where it is impractical to eliminate risks through system design, training and procedures are used. Causal factor can be mitigated through additional training and procedures (reactive)	2
None	No possible mitigation exists, or mitigation is never applied	1

Existing mitigations found in the Technical Instructions were identified and assigned a mitigation effectiveness score based on this ranking. Suggested mitigations to the scenarios generated by the STPA and mitigation effectiveness scores are presented later in this report.

Table 2. Existing mitigations

Description	Mitigation effectiveness score
UN 38.3 testing and quality management system	4
UN 38.3 test summary	3
Strong rigid outer packaging. Acceptable package types and performance qualities identified	4
Requirements to protect equipment against short circuits and damage	4
Package/overpack marks, labels, and documentation indicate the presence of lithium batteries in a consignment	3
Initial acceptance check	2
Inspection prior to loading	2
Handling procedures and personnel training	2

3. APPLYING STPA TO SUPPORT THE SAFE CARRIAGE OF LITHIUM BATTERIES BY AIR

3.1 Goals, requirements, and constraints

This analysis supports the evaluation of the continued safe and efficient air transport of lithium batteries packed with and contained in equipment. Consistent with the STPA technique, the ESD working group identified system level losses to prevent. Losses are defined here as anything of value to any stakeholder in the system.

Table 3. System level losses

Loss ID	Loss description
L1	Loss of aircraft
L2	Loss of human life or injury
L3	Loss of cargo
L4	Loss of confidence in the air transport system
L5	Loss of means to effectively transport lithium batteries (mission)

3.2 System-level hazards

Once system level losses are defined, system level hazards can be identified. Hazards are developed by linking losses to a set of conditions that combined with a worst-case environmental condition could lead to a loss. This does not necessarily guarantee that a hazard will always result in a loss. System level hazards here are restricted to those which can be controlled or managed by controllers within the system. The goal of the analysis is to eliminate or mitigate hazards that can lead to losses.

Table 4. System-level hazards

System hazard ID	Hazard description	Loss link
H1	Aircraft cargo compartment containing lithium batteries experiences a fire	L1-L5
H2a	Aircraft cargo compartment contains damaged lithium batteries	L3
H2b	Aircraft cargo compartment contains defective lithium batteries	L3
H2c	Aircraft cargo compartment contains untested lithium batteries	L4, L5
H3	Aircraft cargo compartment contains non-compliant lithium battery consignments	L4, L5

3.2 System-level safety constraints

System level safety constraints identify those conditions or behaviours that must be satisfied to eliminate hazards or minimize losses should a hazard occur. Each safety constraint is linked to a specific loss identified in [square brackets].

Table 5. System level constraints

System constraint ID	System constraint description
SC1	Fire in aircraft cargo compartment must be prevented [H1]
SC2	If fire in aircraft cargo compartment occurs, it must be detected, and appropriate measures taken to prevent loss [H1]
SC3	Damaged lithium batteries must not be transported by air [H2a]
SC4	If lithium batteries are damaged, they must be detected, and appropriate measures taken to prevent transport by air [H2a]
SC5	Defective lithium batteries must not be transported by air [H2b]
SC6	If lithium batteries are defective, they must be detected, and appropriate measures taken to prevent transport by air [H2b]
SC7	If lithium batteries are untested, they must be identified and approved for transport [H2c]
SC8	Shippers must only offer lithium batteries that comply with relevant requirements [H3]
SC9	If lithium batteries are not compliant with relevant requirements, they must be detected, and appropriate measures taken to prevent transport by air [H3]

3.3 Control structures

The group constructed a high-level hierarchical control structure and several detailed control structures of the lithium battery air transport system. The high-level control structure helps identify the various entities responsible for the safe carriage of lithium batteries in air transport. High level controllers include international organizations and national authorities responsible for the development and implementation of basic safety requirements. Lower-level controllers include shippers/packers and battery manufacturers responsible for preparing shipments and testing batteries and equipment. The high-level control structure and each detailed control structure is composed of feedback control loops. Each control structure contains the following elements:

- a) Controllers;
- b) Control actions;
- c) Feedback;
- d) Other inputs to and outputs from components (neither control nor feedback); and
- e) Controlled processes.

In this hierarchical control structure vertical placement is meaningful. The vertical placement of a control structure entity represents control from high-level controllers at the top to the lowest-level entities (controlled processes) at the bottom. Each entity has control and authority over the entities immediately below it, and each entity is likewise subject to control and authority from the entities immediately above. Control and feedback processes are denoted by downward and upward arrows. Coordination between entities is denoted by two-way arrows and inputs are depicted as one-way horizontal arrows. Note that control does not guarantee obedience. The control and feedback flows in the control structure identified as downward and upward arrows respectively simply indicate that a control or feedback mechanism exists. Just because a controller sends a command, does not mean in practice that it is received or if received that it will be followed. Similarly, just because a feedback path is included in the control structure, does not mean that the feedback will always be sent and if sent that the feedback is accurate. The diagram below is a basic control structure that identifies the major entities responsible for developing and enforcing safety requirements for a consignment of lithium batteries and equipment. A more detailed control structure that includes additional entities including freight forwarders, standards development organizations, and other international entities is included in the attachment to this report.

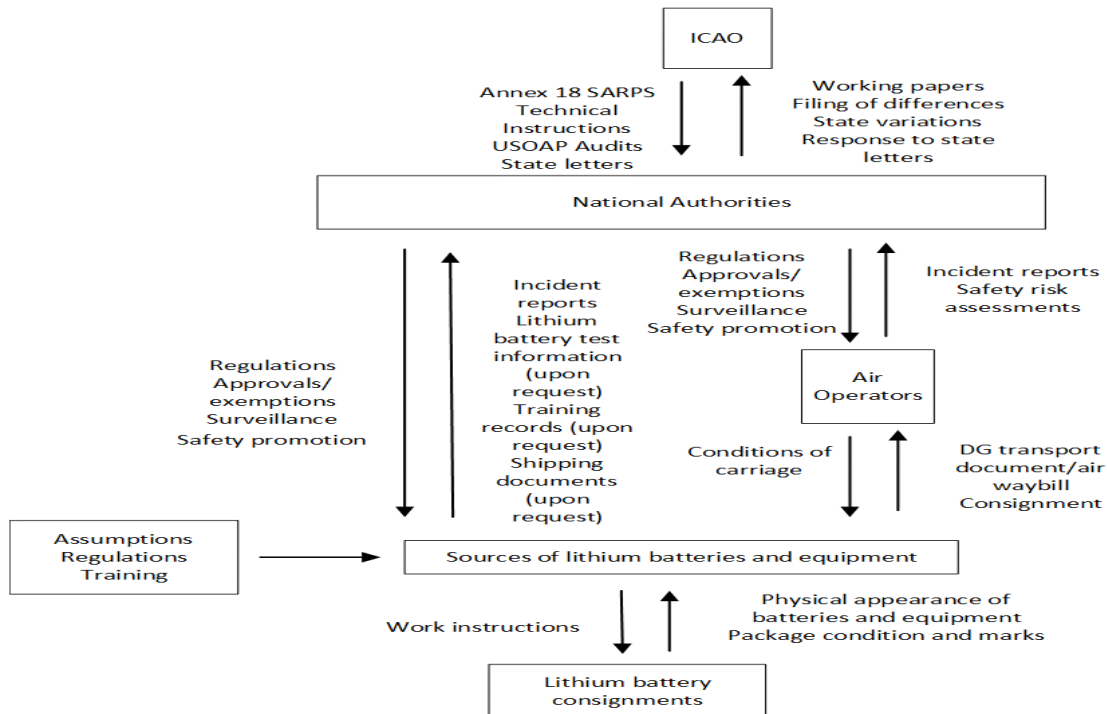


Figure 1. High level control structure

Detailed control structures

The group developed detailed control structures of various components of the high-level control structure that identify the relationships between various entities. Completing several detailed control structures around different parts of the control structure allows for a more complete analysis of the safety control actions designed to help the system enforce constraints and the feedback received. The figures below show detailed control-feedback loops for various controllers. These figures include inputs, decision making processes such as procedures or work instructions and beliefs/mental models of each of these controllers. These additions help identify and develop unsafe control actions and causal scenarios.

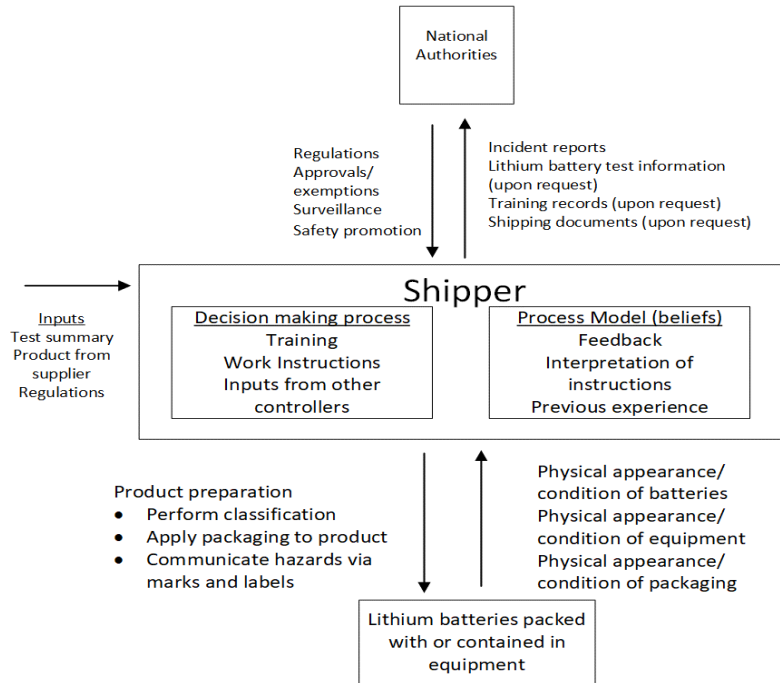


Figure 2. Control-feedback loop for a shipper

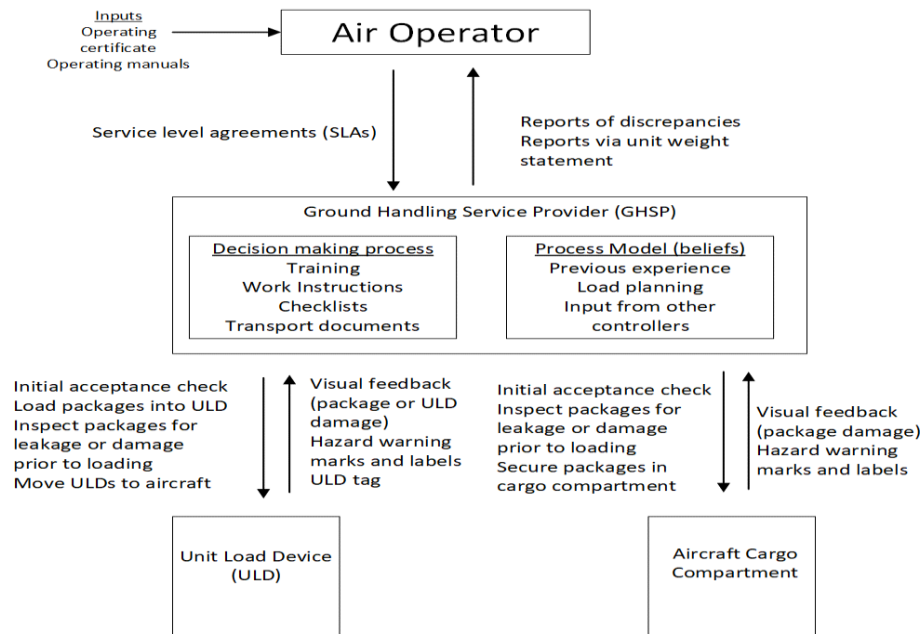


Figure 3. Control feedback loop for a ground handling service provider

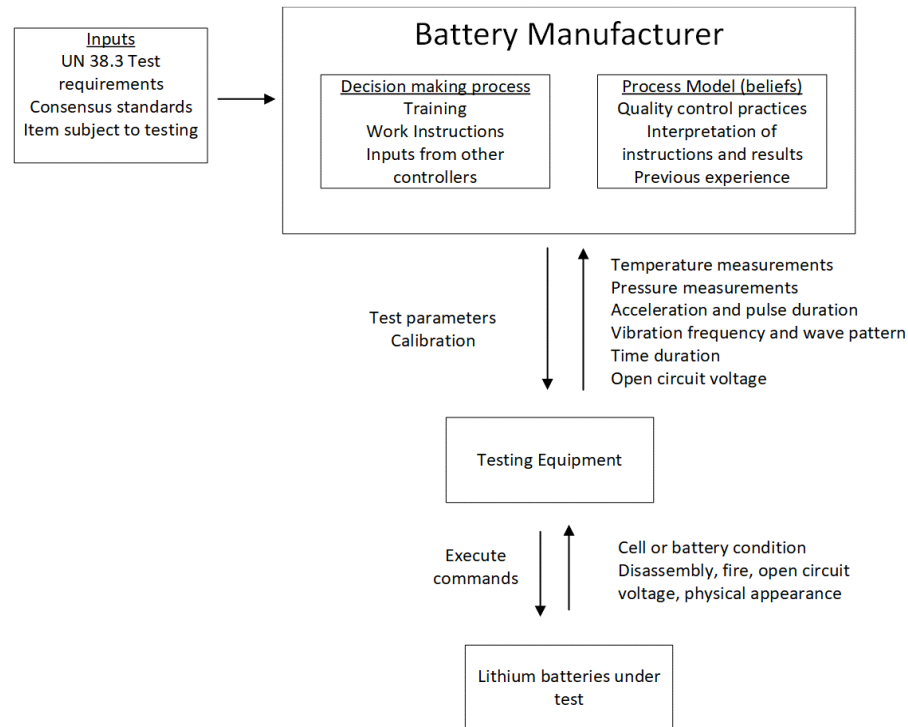


Figure 4. Control-feedback loop for a battery manufacturer

3.4 Identifying unsafe control actions

Each controller in the system has certain responsibilities depicted as downward facing arrows. These responsibilities enforce safety constraints to prevent system level hazards. In this context, an unsafe control action (UCA) is a control action that, in a particular context and worst-case environment, will lead to a system level hazard. STPA identifies four (4) ways that a control action may violate safety constraints:

- a) Providing the control action leads to a hazard.
- b) Not providing the control action leads to a hazard.
- c) Providing a potentially safe control action but too early, too late, or in the wrong order.
- d) The control action lasts too long or is stopped too soon (for continuous control actions, not discrete actions).

For example, a shipper does not apply appropriate marks, labels, or indicate the presence of lithium batteries in a consignment before offering for transport. [H3]

This action is unsafe because it can lead to H3: Aircraft cargo compartment contains non-compliant lithium battery consignments.

In another example, a shipper prepares a consignment of lithium batteries packed with equipment for transport without consulting applicable regulations [H1, H2, H3].

This action is unsafe because it could lead to [H1 - Aircraft cargo compartment containing lithium batteries experiences a fire], [H2a - Aircraft cargo compartment contains damaged lithium batteries], and [H3 - Aircraft cargo compartment contains non-compliant lithium batteries]. While the shipper utilizes packaging, since the shipper does not consult the applicable requirements, the packaging may not be sufficient for transport, or the contents not properly prepared and may become damaged. In a particular set of worst-case conditions, this damage could lead to a fire in the aircraft cargo compartment. Section 5.4 contains tables that identify unsafe control actions for various controllers including shippers, ground handling service providers, and battery manufacturers.

3.5 Identifying causal scenarios associated with unsafe control actions

Once unsafe control actions were compiled, the group identified the causal factors that lead to the unsafe control actions, which in turn led to hazards and by extension, to losses. Working backwards from the UCAs, this produces a list of contextualized scenarios that help explain why an unsafe control action occurred. Generally, causal scenarios explain how incorrect or inadequate feedback, information exchange, and other factors contribute to losses. The scenarios also explain how control actions when provided might not be received or improperly executed. Section 5.5 contains a table listing the various causal scenarios connected to unsafe control actions.

In the previous example of a shipper who does not apply appropriate marks, labels, or indicate the presence of lithium batteries in a consignment before offering for transport [H3] a causal scenario leading to this unsafe action follows.

Scenario: The shipper does not apply appropriate marks, labels or indicate the presence of lithium batteries in or with equipment prior to offering a package for transport [H3]. The shipper typically does not offer dangerous goods for transport and did not recognize that lithium batteries and battery powered equipment are regulated as dangerous goods. As a result, since there are no identifying marks, these non-compliant packages are undetected by the operator and loaded onto the aircraft.

4. RISK EVALUATION

4.1 Identifying mitigations to causal scenarios

The energy storage device working group identified UCAs and causal scenarios involving various controllers in the air transport system. The group identified battery manufacturers, shippers, and ground handling service providers as those controllers whose actions most directly led to hazards and losses. Following an analysis of the system using STPA, the working group developed a list of recommended mitigations or new requirements and applied a mitigation effectiveness score.

Table 6. List of potential additional requirements scored against the mitigation order of precedence and recommended action

Causal scenario ID	Causal scenario description	Recommended mitigation description	Mitigation effectiveness score	Recommended action
	Manufacturers do not conduct UN38.3 tests.	National authorities conduct inspections and surveillance on battery/equipment manufacturers to identify flawed assumptions in the battery testing and equipment environment and conditions that violate assumptions about usage conditions.	3	Add guidance to the new manual under development to support implementation of Annex 18
		Develop detailed requirements to identify acceptable design changes.	2	No action proposed. Requiring manufacturing requirements through transport regulations is complicated.
		Reduce the state of charge for rechargeable batteries.	4	<ol style="list-style-type: none"> 1. Mandatory requirement for packed with equipment 2. Recommendation for contained in equipment
CS 1.1A	Invalid UN 38.3 test results	Require competent authority approval of laboratories conducting UN38.3 testing.	2	<ol style="list-style-type: none"> 1. Submit informal paper to the Sixty-third session of the UN Sub-Committee (27 November to 06 December 2023) seeking support for a requirement in the UN Model Regulations 2. Submit formal proposal to Sixty-fourth session of the UN Sub-Committee if above supported

Causal scenario ID	Causal scenario description	Recommended mitigation description	Mitigation effectiveness score	Recommended action
		Reduce the state of charge for rechargeable batteries.	4	<ol style="list-style-type: none"> 1. Mandatory requirement for packed with equipment 2. Recommendation for contained in equipment
CS 1.2	Manufacturers do not develop and adhere to a quality management system.	Develop detailed requirements for quality assessments including third-party verification.	2	<ol style="list-style-type: none"> 1. Submit informal paper to the Sixty-third session of the UN Sub-Committee (27 November to 06 December 2023) seeking support for the development of detailed requirements for inclusion in the UN Model Regulations 2. Submit formal proposal to Sixty-fourth session of the UN Sub-Committee if above supported
		Develop safety features for battery powered equipment	4	No action proposed. Requiring manufacturing requirements through transport regulations is complicated.
		Reduce the state of charge for rechargeable batteries.	4	<ol style="list-style-type: none"> 1. Mandatory requirement for packed with equipment 2. Recommendation for contained in equipment
CS 1.3	Shipper does not utilize lithium battery test summary information to make a classification decision.	Require shippers to produce lithium battery test summaries as a condition for carriage	2	No action recommended. Considered problematic and the effectiveness of this would be low

Causal scenario ID	Causal scenario description	Recommended mitigation description	Mitigation effectiveness score	Recommended action
CS 2.1	Shipper does not protect the battery from short circuits or damage prior to placement of the battery in the package with equipment.	Increase awareness of shipping and transport requirements	2	Add safety promotion guidance in the new manual under development to support implementation of Annex 18
		Require training for all shippers	2	No action proposed. Training is already required for batteries and equipment in accordance with Section I of the lithium battery packing instructions. It is considered infeasible to require it with those shipped in accordance with Section II due to the potential for every person in the world to be a shipper of these.
		Reduce the state of charge for rechargeable batteries	4	<ol style="list-style-type: none"> 1. Mandatory requirement for packed with equipment 2. Recommendation for contained in equipment
		Design equipment to protect installed batteries	4	No action proposed. Requiring manufacturing requirements through transport regulations is complicated.
		Require more robust packaging	3	Consider adding requirement for packages to be capable of withstanding a 3 m stack test
CS 2.2	Shipper/packer does not secure equipment within the outer packaging when offering for transport	Increase awareness of shipping and transport requirements	2	Add safety promotion guidance in the new manual under development to support implementation of Annex 18
		Require training for all shippers	2	No action proposed. Training is already required for batteries and

Causal scenario ID	Causal scenario description	Recommended mitigation description	Mitigation effectiveness score	Recommended action
				equipment in accordance with Section I of the lithium battery packing instructions. It is considered infeasible to require it with those shipped in accordance with Section II due to the potential for every person in the world to be a shipper of these.
		Reduce the state of charge for rechargeable batteries	4	<ol style="list-style-type: none"> 1. Mandatory requirement for packed with equipment 2. Recommendation for contained in equipment
		Design equipment to protect installed batteries	4	No action proposed. Requiring manufacturing requirements through transport regulations is complicated.
CS 3.1	Shipper/ packer selects a package of insufficient strength leading to damage of the contents during handling.	Increase awareness of shipping and transport requirements	2	Add safety promotion guidance in the new manual under development to support implementation of Annex 18
		Require training for all shippers	2	No action proposed. Training is already required for batteries and equipment in accordance with Section I of the lithium battery packing instructions. It is considered infeasible to require it with those shipped in accordance with Section II due to the potential for every person in the world to be a shipper of these.

Causal scenario ID	Causal scenario description	Recommended mitigation description	Mitigation effectiveness score	Recommended action
		Reduce the state of charge for rechargeable batteries	4	<ol style="list-style-type: none"> 1. Mandatory requirement for packed with equipment 2. Recommendation for contained in equipment
		Design equipment to protect installed batteries	4	No action proposed. Requiring manufacturing requirements through transport regulations is complicated.
		Require more robust packaging	3	Consider adding requirement for packages to be capable of withstanding a 3 m stack test
CS 3.2	Ground handling service provider damages packages during handling	Require quarantine or inspection of all packages subject to suspected damage	3	Add a recommendation for operators to establish procedures to follow when damage is suspected or after dropping packages with lithium batteries. Potentially for multimodal as well.
		Reduce the state of charge for rechargeable batteries	4	<ol style="list-style-type: none"> 1. Mandatory requirement for packed with equipment 2. Recommendation for contained in equipment
		Design equipment to protect installed batteries	4	No action proposed. Requiring manufacturing requirements through transport regulations is complicated.
		Review training and procedures for package handlers	2	If handling procedures are added to the Technical Instructions, training would naturally follow.

Causal scenario ID	Causal scenario description	Recommended mitigation description	Mitigation effectiveness score	Recommended action
		Require more robust packaging	3	Consider adding requirement for packages to be capable of withstanding a 3 m stack test
CS 4.1	Shipper does not apply appropriate marks, labels, or indicate the presence of lithium batteries in a consignment.	Eliminate provisions that allow consignments to be transported without identifying marks and documentation	3	No action proposed.
Require training for all shippers		2	No action proposed. Training is already required for batteries and equipment in accordance with Section I of the lithium battery packing instructions. It is considered infeasible to require it with those shipped in accordance with Section II due to the potential for every person in the world to be a shipper of these.	
Reduce the state of charge for rechargeable batteries		4	1. Mandatory requirement for packed with equipment 2. Recommendation for contained in equipment	
Design equipment to protect installed batteries		4	No action proposed. Requiring manufacturing requirements through transport regulations is complicated.	
Require more robust packaging		3	Consider adding requirement for packages to be capable of withstanding a 3 m stack test	
Require shipper to sign a declaration that package or consignment does not contain dangerous goods		2	1. Require shippers to sign a declaration that package does not contain dangerous goods in an appropriate	

Causal scenario ID	Causal scenario description	Recommended mitigation description	Mitigation effectiveness score	Recommended action
				ICAO document (e.g. Annex 6 — <i>Operation of Aircraft</i> or Annex 9 — <i>Facilitation</i>) 2. Require that operators not accept packages without signed declaration
4.2	Operator accepts a consolidation of multiple consignments of lithium batteries contained in equipment in a mail sack without marks, labels, and declaration.	Eliminate provisions that allow consignments to be transported without identifying marks and documentation	3	No action proposed. I can't remember justification for no action
Require training for all mailers		2	No action proposed. It is considered infeasible to require it with those shipped in accordance with Section II due to the potential for every person in the world to be a shipper of these.	
Reduce the state of charge for rechargeable batteries		4	1. Mandatory requirement for packed with equipment 2. Recommendation for contained in equipment	
Institute requirements for mailers to indicate the presence of electronic equipment or items containing batteries or attest to the absence of electronic equipment containing lithium batteries.		2	1. Require mailers to sign a declaration that package does not contain dangerous goods. 2. Require postal operators to not accept packages without signed declaration	

5. CONCLUSION

The Technical Instructions identify the conditions in which lithium ion batteries and battery powered devices can be accepted for transport by air. These conditions identified as requirements and packing instructions are intended to ensure that the safety of dangerous goods in air transport is assured. Effectiveness of requirements can be inferred by a reduction of incidents from a specific cause, but little can be said about overall system safety other than incidents continue to occur. Compliance with safety requirements is verified using checklists, comparing a consignment with the package and documents provided by shippers, and a physical inspection. However, damaged, or improperly packaged lithium batteries and equipment are not readily identifiable through a physical inspection. Shipments that do not have visible marks or labels or shipping documents that identify the consignment as dangerous goods, are not subject to additional checks required for dangerous goods. The DGP-WG/Energy Storage Devices identified several themes throughout its analysis.

- a) The supply chain for lithium ion batteries and devices is fragmented and has many interactions amongst supply chain participants that introduce the possibility of safety issues.
- b) The dangerous goods air transport system is based on trust whereby downstream supply chain participants e.g. operators rely on information provided by entities further up the chain e.g. battery and equipment manufacturers, and shippers. However, these entities (battery or equipment manufacturer, shipper, freight forwarder, operator and the civil aviation authority) are often disconnected.
- c) A shipment prepared for transport may pass through multiple intermediaries such as freight forwarders and logistics agents who may not actually see a consignment. As such compliance with requirements is often assured only through the provision of suitable documentation and inspections immediately prior to loading.
- d) Checklists (for Section I shipments) and an external inspection of packages are the primary methods for operators to determine whether a package conforms to the regulations. However, acceptance checklists can only verify that the quantity is within limits, the packaging is undamaged, and the marks and labels accord with the dangerous goods transport document, and the external inspection of Section II shipments may be cursory.
- e) Civil aviation authorities obtain most of their information on safety performance through incident reports and inspections..
- f) While the ICAO can add requirements to the Technical Instructions national authorities are responsible for oversight. Manufacturers, shippers, and operators are responsible for complying with the provisions of the regulations. Collaborative work with all supply chain participants, will be necessary to ensure requirements are met.
- g) Additional requirements should be targeted at maximizing safety throughout the supply chain and work with supply chain participants to develop a means to ensure requirements are met.

5.1 **Future work**

The working group on energy storage devices developed detailed control structures and unsafe control actions for battery manufacturers, shippers, and ground handling service providers. Additional work could focus on the exploring the relationships between the original shipper, intermediaries including freight forwarders, indirect air carriers and the operator. These entities do not move cargo but instead contract with an operator and may assume the role of the shipper. The relationship between mailers, designated postal operators, national competent authorities and operators is another aspect of the control structure identified but not investigated in this report. The control structure depicting battery testing could be revisited to further identify specific inputs and feedback to derive detailed UCAs and causal scenarios that lead to the presence of low-quality batteries. Processes that involve battery assembly and integration of batteries into equipment and equipment testing could also be explored to identify how batteries that otherwise comply with testing can create safety hazards.

ATTACHMENT

GLOSSARY OF TERMS

This report utilizes various terms used in normal parlance that denote a specific meaning within the context of this report. The following table defines many of these terms, derived or adapted from the STPA handbook.

Causal factor	A causal factor is an element that contributes to unsafe control actions and eventually system-level hazards.
Causal scenario	A causal scenario describes the contributing factors that cause unsafe control actions, why they could happen and how these causal factors lead to system-level hazards.
Control algorithm	The control algorithm represents the controller's decision-making process—it determines the control actions to provide.
Control action	A control action is the bringing about of an alteration in the system's state through activation of a device or implementation of a procedure with the intent of regulating or guiding the operation of a human being, machine, apparatus, or system.
Controller	The controller provides control actions on the system and gets feedback to determine the impact of the control actions. The controller enforces constraints on the behaviour of the system.
Feedback	Feedback includes evaluative or corrective information about an action, event, or process that is transmitted to the original or controlling source.
Loss	A loss involves something of value to stakeholders. Losses may include a loss of human life or human injury, property damage, environmental pollution, loss of mission, loss of reputation, loss or leak of sensitive information, or any other loss that is unacceptable to the stakeholders.
Process model	Process models represent the controller's internal beliefs used to make decisions. Process models may include beliefs about the process being controlled or other relevant aspects of the system or the environment.
System-level constraint	A constraint specifies system conditions or behaviours that need to be satisfied to prevent hazards (and ultimately prevent losses).
System-level hazard	A hazard is a system state or set of conditions that, together with a particular set of worst-case environmental conditions, will lead to a loss.
Unsafe control action	An Unsafe Control Action (UCA) is a control action that, in a particular context and worst-case environment, will lead to a hazard.

SYSTEM-LEVEL LOSS TABLE

The below table shows system level losses identified by the DGP-WG/Energy Storage Devices.

Loss ID	Loss description
L1	Loss of aircraft
L2	Loss of human life or injury
L3	Loss of cargo
L4	Loss of confidence in the air transport system
L5	Loss of means to effectively transport lithium batteries (mission)

SYSTEM-LEVEL HAZARD TABLE

The below table shows system level hazards identified by the DGP-WG/Energy Storage Devices. System-level hazards are linked to specific losses.

System hazard ID	Hazard description	Loss link
H1	Aircraft cargo compartment containing lithium batteries experiences a fire	L1-L5
H2a	Aircraft cargo compartment contains damaged lithium batteries	L3
H2b	Aircraft cargo compartment contains defective lithium batteries	L3
H2c	Aircraft cargo compartment contains untested lithium batteries	L4, L5
H3	Aircraft cargo compartment contains non-compliant lithium battery consignments	L4, L5

SYSTEM RESPONSIBILITIES

The responsibilities involve providing control actions and receiving feedback, thus creating the control-feedback loops of the **high-level control structure**.

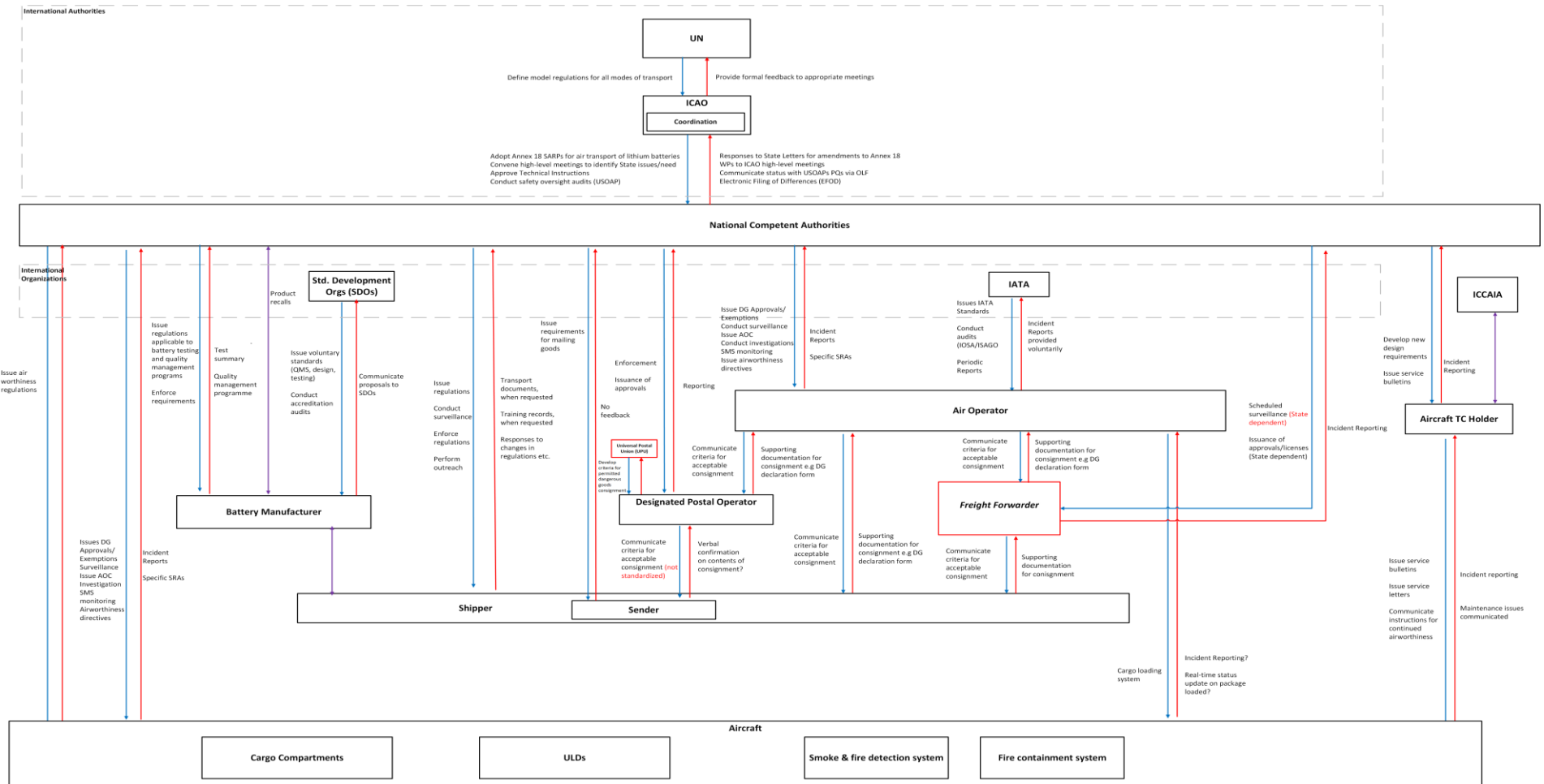
The controller and their responsibilities are identified in the context of the mission (i.e., continued safe and efficient air transport of lithium batteries packed with and contained in equipment).

System responsibilities	
Controller	Description
International Civil Aviation Organization (ICAO)	<ul style="list-style-type: none"> — Defines international Standards and Recommended Practices (SARPs), the Technical Instructions, and guidance material aimed at industry for the safe transport of dangerous goods by air — Establishes responsibilities for States — Conducts audits through its Universal Safety Oversight Audit Program (USOPA) on States for compliance with ICAO SARPs (Annex 6, Annex 18)
National competent authorities (NCA)	<ul style="list-style-type: none"> — Promulgate regulations for the safe transport of dangerous goods by air — Promulgate regulations for required aircraft features e.g handheld fire extinguishers, fire suppression systems — Conduct inspections and surveillance of air operators and other entities that offer dangerous goods for transport by air — Enforce regulations on regulated entities (e.g air operators, shipper, freight forwarders, designated postal operators (DPOs), ground handling service providers (GHSPs), packaging manufacturer) where non-compliance with Technical Instructions is identified — Issue air operator certificates (AOCs) — Issue specific approval for operator to carry dangerous goods as cargo — Approve policies, procedures and training developed by DPO — Grant approvals or exemptions for the transport of dangerous goods incl. lithium batteries — Investigate occurrences — Ensure operator conducts safety risk assessments of cargo compartment safety
Battery manufacturer or distributor	<ul style="list-style-type: none"> — Produces and distributes batteries that have passed all applicable UN 38.3 tests — Implements a quality management programme for the manufacture of lithium cells and batteries — Makes available UN 38.3 test summary

System responsibilities	
Controller	Description
Shipper/consignor/packer	<ul style="list-style-type: none"> — Ensure that employees tasked with preparing shipments are competent to perform the tasks — Classify lithium batteries and products with lithium content based in accordance with the Technical Instructions — Pack, mark, and label packages in accordance with the Technical Instructions prior to shipment — Complete dangerous goods transport document describing dangerous goods offered for transport in accordance with Part 5;4 of the Technical Instructions or provide appropriate information to be included on the air waybill, as applicable
Airline operations	<ul style="list-style-type: none"> — Document policies and procedures for the acceptance and handling of dangerous goods — Ensure that employees tasked with accepting and handling dangerous goods are competent to perform the task — Develop and implement effective controls to prevent the introduction of dangerous goods not in accordance with the Technical Instructions Chapter 7;6.1 — Conduct acceptance checks when triggered (with specific exceptions with respect to lithium batteries) — Perform safety risk assessment on cargo compartment safety — Review safety risk assessment based on change to operation and incidents that indicate risk mitigations may not be adequate (Doc 10102, guidance) — Report dangerous goods incidents to the NCA in accordance with the Technical Instructions — Develop and implement a process for investigation of reported incidents and identification and verification of appropriate corrective actions
Cargo compartment	Contain packages (different classes exist that meet certain regulatory standards concerning accessibility, a means to exclude hazardous quantities of smoke or extinguishing agent, smoke a fire detection, and a means to extinguish or control a fire)
Ground handling service provider (operator and/or 3rd party)	<ul style="list-style-type: none"> — Documents policies and procedures for the handling of dangerous goods — Ensures that employees tasked with handling dangerous goods are competent to perform the task — Loads/unloads packages into cargo compartment — Secures packages in cargo compartment — Secures packages in unit load device
Unit load devices (ULDs)	Contain packages in a single consolidation to provide protection or convenience of handling. Examples include any type of freight container, aircraft container, or aircraft pallet with a net. Some ULDs also have fire-resistant capabilities — no regulatory requirement for fire resistance.

CONTROL STRUCTURE

A high-level hierarchical control structure of the lithium battery air transport system was developed to identify and analyse the various entities responsible for the safe carriage of lithium batteries in air transport. High level controllers include international organizations and national authorities responsible for the development and implementation of basic safety requirements. Lower-level controllers include shippers/packers and battery manufacturers responsible for preparing shipments and testing batteries and equipment. This control structure includes additional entities not covered in this analysis including freight forwarders, standards development organizations and other international organizations.



UNSAFE CONTROL ACTIONS

The STPA specifies four ways a control action can be unsafe (represented in the columns below). Highlighted unsafe control actions are also reflected in causal scenarios:

Control Action	Control action provided	Control action not provided	Control action provided too early/too late	Control action stopped too soon or applied too long
Cell/Battery Manufacturer Complete UN 38.3 Tests Subject lithium batteries to UN 38.3 design tests Part 2;9	Battery manufacturer completes UN 38.3 tests on battery with the wrong input information [H2c, H3]	Battery manufacturer does not subject lithium batteries to UN 38.3 tests [H2c, H3]	Battery manufacturer completes UN 38.3 tests before subsequent changes are made to battery design [H2c, H3]	Battery manufacturer completes UN 38.3 tests in incorrect sequence [H2c, H3]
Cell/Battery Manufacturer Provide Lithium Battery Test Summary Develop and make available a lithium battery test summary	Battery manufacturer provides test summary for a battery different than that tested [H2c, H3]	Battery manufacturer does not make available test summary information [H2c, H3]	Battery manufacturer provides test summary information after subsequent shipper has offered the battery for transport [H3]	Battery manufacturer provides out of date test summary information [H3]
Cell/Battery Manufacturer Manufacture under a quality management programme	N/A	Battery manufacturer does not develop and adhere to a quality management system while producing batteries [H2b, H3]	Battery manufacturer quality management programme applied after design defects are discovered [H2b, H3]	Battery manufacturer continues to apply the same quality management programme without updating to account for changes in design or inputs [H2b, H3]

Control Action	Control action provided	Control action not provided	Control action provided too early/too late	Control action stopped too soon or applied too long
<p>Shipper</p> <p>Classify product</p> <p>The shipper must ensure the goods are not forbidden for transport by aircraft and ensure the goods are properly classified as required by the Technical instructions.</p>	N/A	Shipper does not classify product prior to offering for transport [H3]	Shipper classifies product after offering for transport [H3]	N/A
<p>Shipper</p> <p>Apply packaging</p> <p>Adhere to inner packaging and the maximum quantity per package limits.</p> <p>Select appropriate types of packaging according to the packing instructions.</p> <p>Apply closures to inner and outer packagings as appropriate.</p> <p>Secure packages within an overpack when applicable.</p>	Shipper applies packaging without consulting applicable requirements when offering for transport [H1, H2a, H2c, H3]	<p>Shipper does not pack product in strong rigid outer packaging when offering for transport [H1, H2a, H3]</p> <p>Shipper does not secure equipment within the outer packaging when offering for transport [H1, H2a, H3]</p> <p>Shipper does not protect the battery from short circuits prior to placement of the battery in the package [H1, H2a, H3]</p>	N/A	N/A

Control Action	Control action provided	Control action not provided	Control action provided too early/too late	Control action stopped too soon or applied too long
<p>Shipper</p> <p>Communicate hazards via marks, labels, and documents</p> <p>Apply appropriate marks and labels as required by the Technical Instructions.</p> <p>Complete transport documents and sign declaration when applicable</p>	<p>Shipper applies marks and labels to communicate hazards however visibility by is obscured [H3]</p>	<p>Shipper applies marks and labels that do not reflect the contents of the package [H3]</p> <p>Shipper does not apply appropriate marks, labels, or indicate the presence of lithium batteries in a consignment before offering for transport [H3]</p>	<p>N/A</p>	<p>Shipper applies marks and labels without completing documentation when offering for transport [H3]</p> <p>Shipper completes documentation however does not apply marks and labels when offering for transport [H3]</p>

Control Action	Control action provided	Control action not provided	Control action provided too early/too late	Control action stopped too soon or applied too long
Ground Handling Service Provider/Operator Perform acceptance check	<ul style="list-style-type: none"> — Ground handling service provider performs acceptance check using checklist without inspecting the package for damage [H2a, H3] — Ground handling service provider performs acceptance check without the means to verify the information on form [H3] — Ground handling service provider performs acceptance check when it is not possible to validate all the information on checklist [H3] 	Ground handling service provider does not perform acceptance check [H2a, H3]	Ground handling service provider performs acceptance check after packages are loaded into ULD [H2a, H3]	Ground handling service provider performs acceptance check on some but not all incoming packages prior to loading into ULD [H2a, H3]
Ground Handling Service Provider/Operator Inspect package for leakage/damage	N/A	Ground handling service provider does not inspect the package for leakage or damage prior to loading into ULD or aircraft cargo compartment [H1, H2a, H3]	N/A	Ground handling service provider does not perform any further inspections on package once it has been subjected to initial acceptance check [H1, H2a, H3]

Control Action	Control action provided	Control action not provided	Control action provided too early/too late	Control action stopped too soon or applied too long
<p>Ground Handling Service Provider/Operator</p> <p>Loads packages into unit load device or aircraft cargo compartment</p> <p>Loads unit load device into aircraft cargo compartment</p>	<p>Ground handling service provider loads damaged packages into ULD or aircraft cargo compartment [H1, H2a]</p> <p>Ground handling service provider places excessive superimposed weight on packages [H1, H2a]</p> <p>Ground handling service provider places too many packages placed into a ULD [H1, H2a]</p>	<p>Ground handling service provider does not secure packages against excessive movement inside of ULD [H1, H2a]</p> <p>Ground handling service provider does not secure packages against excessive movement inside of aircraft cargo compartment [H1, H2a]</p>	N/A	N/A

CAUSAL SCENARIOS TABLE

Causal scenarios are presented in the following tables as small stories that explain not only the contributing factors that cause unsafe control actions, why they could happen and resulting hazards.

CS ID	Unsafe control action	Causal scenario
1.1	Manufacturer does not subject lithium batteries to UN 38.3 testing and does not have a quality management system in place prior to offering for transport. [H2c, H3]	<p>A manufacturer does not subject lithium batteries to UN 38.3 testing because they believed the product being manufactured was sufficiently similar to a tested design.</p> <p>Manufacturer creates a battery that is intended to mimic a brand name to a tested type (counterfeit)</p> <p>Battery assembler manufacturers batteries from tested cells but does not test the assembled battery</p>
1.2	Manufacturer did not develop and adhere to a quality management system for battery manufacturing process while producing batteries. [H2b-H3]	<p>QA process does not include ongoing surveillance and defects were not detected prior to distribution</p> <p>QA process not sufficient or non-existent introducing defects into battery products</p>

CS ID	Unsafe control action	Causal scenario
1.3	<p>Shipper does not utilize lithium battery test summary information to make a classification before offering a package containing lithium batteries for transport because... leading to potentially non-compliant batteries loaded into an aircraft cargo compartment. [H3]</p>	<p>The shipper did not obtain the test summary information.</p> <p>The manufacturer or distributor does not make available a lithium battery test summary.</p> <p>Battery in the device is of an unknown origin.</p> <p>The shipper believes this information is unnecessary to make classification decisions. The shipper has sufficient information for shipping purposes based on a physical examination.</p> <p>The test summary does not match the product in the package.</p> <p>The shipper has a refurbished device containing a battery that is different than the original battery reflected in the available test summary.</p> <p>The devices contain batteries from a product different from that originally manufactured and used.</p>
2.1	<p>Shipper/packer does not protect the battery from short circuits prior to placement of the battery in the package with equipment because... As a result, terminals contact electrically conductive material in the same package generating excessive heat leading to a fire. [H1, H2a, H3]</p>	<p>The shipper assumes that the terminals are inherently protected.</p> <p>The shipper utilizes a package that is too large for the contents and subsequent shifting of the contents damages the battery.</p> <p>Shipper/packer misunderstands, mis-interprets or is unaware of this requirement.</p> <p>Shipper/packer does not recognize the importance of short circuit protection.</p> <p>Shipper/packer assumes that battery is sufficiently protected from short circuits without additional action.</p> <p>Electrically conductive products are placed into the same package as a battery.</p>

CS ID	Unsafe control action	Causal scenario
2.2	<p>Shipper/packer does not secure equipment within the outer packaging when offering for transport because...</p> <p>As a result, equipment is damaged due to shifting of the equipment or other contents in the in the same package, overpack, or adjacent consignments. [H1, H2a, H3]</p>	<p>The shipper/packer assumes that the package is sufficient to protect the equipment without additional securement</p> <p>Shipper/packer misunderstands, mis-interprets or is unaware of this requirement or the presence of a lithium battery contained in the equipment</p> <p>Shipper/packer does not recognize the importance of protecting against damage</p> <p>Shipper/packer determines the equipment is sufficiently protected from damage without additional action</p> <p>Shipper/packer determines the equipment does not require an outer packaging</p>
3.1	<p>Shipper/packer selects a package of insufficient strength leading to damage of the contents during handling and damage not detected prior to loading into the aircraft cargo compartment leading. [H1, H2a, H3]</p> <p>As a result, package contents are damaged through stacking or other handling conditions typically encountered in transportation immediately prior to or after loading into the aircraft cargo compartment.</p>	<p>Shipper does not recognize the hazard associated with the product if damaged.</p> <p>Shipper does not use sufficient cushioning material to protect batteries from damage from other items in the same package.</p> <p>Shipper places an item in the package heavier than package capability.</p> <p>Shipper does not understand the packing requirements of the Technical Instructions and selects a package of insufficient durability.</p>

CS ID	Unsafe control action	Causal scenario
3.2	<p>Ground handling service provider damages packages during handling leading to damage to contents prior to loading into the aircraft cargo compartment leading. [H1, H2a]</p> <p>As a result, package contents are damaged due to abuse conditions immediately prior to or after loading into the aircraft cargo compartment.</p>	<p>Packages crushed from overtightening of nets or pallet straps</p> <p>Too many packages pushed through a mechanized sort system /chute at once</p> <p>Forklift tines or handling vehicles crush packages containing batteries and equipment</p> <p>Penetration of packaged from external source such as forklift tines</p> <p>Package is dropped from a height greater than that capable of withstanding</p> <p>Packages consolidated improperly leading to excessive superimposed weight</p> <p>Packages inspected prior to consolidation but damaged during subsequent handling</p>
4.1	<p>The shipper does not apply appropriate marks, labels, or indicate the presence of lithium batteries in a consignment before offering for transport because...</p> <p>As a result, the shipper offered non-compliant batteries for transport leading to the possibility that misclassified batteries/equipment are loaded into an aircraft cargo compartment. [H3]</p>	<p>The shipper did not recognize that lithium batteries and equipment are regulated as dangerous goods.</p> <p>For lithium batteries contained in equipment (including button cells on circuit boards) (2 batteries/4 cells) up to 2 packages per consignment shippers need not apply marks, labels or identify to the operator.</p> <p>Regulations create an incentive to classify batteries as equipment or batteries packed with equipment.</p> <p>Changes in the physical appearance of batteries e.g., powerbanks leads to a shipper misclassify a battery as equipment.</p> <p>Shipper misclassifies certain a packaged batteries or a powerbank packed with an item of equipment as batteries packed with equipment.</p>

CS ID	Unsafe control action	Causal scenario
4.2	<p>Operator accepts a consolidation of multiple consignments of lithium batteries contained in equipment in a mail sack without marks, labels, and declaration. [H3]</p> <p>As a result, operators do not take actions or follow procedures specifically identified for handling dangerous goods.</p>	<p>Operators are not provided information regarding the true contents of a package or consignment.</p> <p>Operators do not observe or take special actions when consignments of batteries packed with or contained equipment display lithium battery marks but not hazard warning labels.</p> <p>Regulations are being applied in a manner beyond which they were intended.</p> <p>Changes in distribution system introduce potential for consolidation of many individual consignments. Each consignment is acceptable, but the consolidation of multiple packages in a mail sack is beyond the original intent of the Technical Instructions.</p> <p>Offerors are non-traditional dangerous goods personnel that only prepare lithium batteries/equipment.</p> <p>Regulations for shipping lithium batteries in the post do not support system constraints.</p>

**APPENDIX C TO THE REPORT ON AGENDA ITEM 4
(English only)**

ANALYSIS OF DGP/28 COMMENTS

1. INTRODUCTION

1.1 The working group on energy storage devices met virtually on 19 September 2023. During this meeting the working group agreed to submit to the DGP a working paper and two information papers that detail the results of its analysis on the transport of lithium batteries packed with and contained in equipment (See DGP/29-WP41, DGP/29-IP/1, and DGP/29-IP/2). The Secretariat explained that the proposals from DGP/28 that proposed state of charge limits for lithium ion batteries packed with equipment and contained in equipment would be resubmitted for consideration during DGP/29 (see DGP/29-WP/6). The working group recognized that those proposals were not fully mature and outstanding comments remained. Therefore, the working group decided to reconsider the DGP/28 comments (see DGP/28-WP/59; Section 4.3 and Appendix B) with the goal of resolving those comments where possible to provide the Panel the information necessary to make a fully informed decision.

1.2 The working group separated the DGP/28 comments into discrete themes and identified the available information that could be considered to address the comments. The working group also recognized that any potential amendments based on WGP/29-WP/6 would need to be further developed should the Panel agree to amendments to the Technical Instructions. The comment themes identified include:

- 1) data;
- 2) incident reports;
- 3) economic impact and market feasibility;
- 4) regulatory compliance liability for shipper other than the OEM;
- 5) lower SOC could lead to cell degradation;
- 6) provisions to facilitate transport of certain lifesaving/life-sustaining medical devices;
and
- 7) revisiting assumptions from what we have learned.

2. ANALYSIS

2.1 The panel over the last several years has reviewed extensive data involving lithium batteries and equipment including safety testing of various sizes, form factors and chemistries of lithium batteries forced into thermal runaway at various states of charge, effectiveness of aircraft fire suppression systems, trends in lithium ion battery energy density, and air transport volumes. This yields a clear summary of certain identifiable trends and challenges to developing policies and actions the panel could take to support safe and efficient transport.

2.1.1 What we know

Safety impacts of reduced State of Charge (SOC) on the probability of a lithium-ion cell or battery to go into thermal runaway

- a) Batteries shipped at a reduced SOC are known to be less prone to thermal runaway as demonstrated through testing.
- b) The 30% SOC limit derived from testing of standard cells has been verified by multiple sources. It is recognized that the 30% limit might not be precise for all cell/battery designs; however, that limit is generally considered to be a practical safety limit to apply as a rule of general applicability.
- c) The limit is applied based on data from testing at cell/battery level, therefore this measurement of the likelihood of a cell/battery to go into thermal runaway is independent of package or equipment transport configuration. See: Report: Summary of FAA Studies Related to the Hazards Produced by Lithium Cells in Thermal Runaway in Aircraft Cargo Compartments - www.fire.tc.faa.gov/pdf/TC-16-37.pdf

Safety impacts of reduced SOC on the severity of reaction or consequence of thermal runaway

- a) Lower states of charge are well known for reducing the severity of a thermal runaway event. Test data indicates that severity from thermal runaway of commonly transported cells at 30% SOC or less is significantly reduced as compared to cells at higher SOC's, and in many cases, thermal runaway is not likely to propagate to other cells.
- b) Package configurations, including density and proximity of cells impact the severity of an event. However, the ability to propagate to other cells is greatly reduced for cells under 30% SOC.

Increasing Energy of lithium ion batteries

- a) Heat released during thermal runaway is impacted by the total energy storage capacity of a cell. Said another way, energy released during thermal runaway increases with increased stored energy.
- b) U.S. Department of Energy information shows a trend of increasing energy density of lithium-ion batteries from 2008-2020. See [FOTW #1234](#), April 18, 2022: Volumetric Energy Density of Lithium-ion Batteries Increased by More than Eight Times Between 2008 and 2020.
- c) The practical impacts of increasing energy density are that batteries in thermal runaway release heat faster making it less likely that the heat generated can be dissipated to the surrounding environment leading to increased consequences of thermal runaway. See: Journal of Electrochemical Society, [Investigating the Role of energy Density in Thermal Runaway of Lithium-Ion Batteries with Accelerating Rate Calorimetry](#). Also see: [DGP-WG/22-IP/1](#)

Increasing volume of shipments

- a) The panel reviewed information presented to DGP-WG/22 that represented U.S. Import-Export data for UN3480/UN3481/UN3090 transported by air from 2015-2021.
- b) The figures indicate a continued increase in air transport of UN3481. Increased transport increases exposure to risk within the air transport system. See: [DGP-WG/22-IP/14](#)

Aircraft cargo compartment capabilities

- a) Lithium batteries release hydrogen and other flammable gases at various stages of thermal runaway. Concentrations of these gases could exceed the ability of current fire suppression systems. See: [DGP-WG/22-IP/9](#)
- b) Lithium batteries, if subjected to thermal runaway, have the potential to generate a pressure pulse within the cargo compartment. This pulse could potentially lead to the displacement of pressure relief panels, thus permitting the fire suppressant (halon) to escape into other compartments within the aircraft. This, in turn, could compromise the overall effectiveness/capabilities of the aircraft's fire suppression system. See: www.fire.tc.faa.gov/pdf/TC-16-37.pdf

2.1.2 What we don't know

2.1.2.1 Exact transport volumes and configurations of lithium batteries in any shipment and whether equipment adequately protects batteries from thermal runaway, contains the effects of a battery that has gone into thermal runaway or provides an additional means to initiate thermal runaway. There are infinite equipment designs incorporating batteries and package configurations containing equipment with batteries and defining a configuration that would support higher states of charge without propagation is difficult to predict. Despite extensive review of incident reports, causes of thermal events involving lithium batteries can only be attributed to general causes.

2.2 INCIDENT REPORTS**2.2.1 What we know**

2.2.1.1 Incidents involving lithium ion batteries contained in or packed with equipment continue to occur within the air transport system and are not limited to one industry sector or geographic region. Most incidents were identified during storage incidental to transport, prior to loading and after unloading. Incidents also occurred during subsequent ground transport after the package was transported by air. Recorded incidents are relatively minimal in total, especially in comparison to the volume of shipments. The primary source of incident figures presented was from the UL managed voluntary system titled "Thermal Runaway Incident Program" or TRIP.

- a) One relevant trend detected by the TRIP information is that incident reports for UN3480 have trended down since 2016 when ICAO implemented the 30% SOC limit for packaged batteries, while incidents reports for UN3481 have trended up during that same time. See: [DGP-WG/22-IP/10](#)

- b) An 11 April 2021 incident brought to the Panel’s attention that occurred on the apron at Hong Kong International Airport involving a pallet containing cellular phones illustrates the consequences of a thermal runaway event involving consumer electronic devices containing a single installed lithium ion battery. See: [DGP/28-IP/2](#)

2.2.2 What we don’t know

2.2.2.1 The cause of most lithium ion battery failures within the transportation system. Failure could arise from many factors, including non-compliance with manufacturing quality control, design testing, improper packaging, or rough handling. Recognizing there are incidents in the air transport system, there is not a specified number of incidents that would define an acceptable number of incidents. Further, there is not a measurement that considers an acceptable number of incidents when compared to a known mitigation measure to reduce risk.

2.3 ECONOMIC IMPACT AND MARKET FEASIBILITY

2.3.1 What we know

2.3.1.1 Implementation of a 30% SOC on packaged batteries for transport by cargo air did not stop the transport of packaged lithium ion batteries. The reduction of SOC for transport has become an accepted practice and experience indicates that the overall impact of implementing this safety mitigation measure is not as negative as might have been perceived. Import/export data indicate the use of lithium ion battery technology continues to expand. Anecdotal evidence also indicates that large well known lithium battery and equipment manufacturers ship products at a reduced state of charge. This implementation would appear to confirm that the technology exists to manage battery SOC. Although an approval reference was included for instances where air transport was necessary at higher than 30% SOC, very few approval requests have been submitted. Experience with packaged lithium ion batteries appears to show the ability to apply technology and process procedures to manage a specific SOC.

2.3.2 What we don’t know

2.3.2.1 Some industry sectors already implement a process in their production line to control the state of charge prior to packaging and shipping. We do not currently have sufficient information to determine whether this practice is commonplace. Representatives from some sectors of industry indicated that implementation of a reduced SOC would be difficult or could cause extreme economic impact. It is unclear if this industry concern is related to safety, consumer marketing or simply a preference. No specific economic impact data has been provided that might indicate negative impacts on manufacturing processes, production times, or business practices.

2.4 REGULATORY COMPLIANCE LIABILITY FOR SHIPPER OTHER THAN THE OEM

2.4.1 What we know

2.4.1.1 A reduced SOC for batteries packed on their own and not for batteries packed with or contained in equipment was a conscious decision of the panel. Based on experience from implementation of a 30% SOC limit on packaged batteries, no significant hardship or inability to ship critical or time-sensitive cargo has been verified. Comments from DGP/28 indicate a recognition that establishing a 30% SOC was routine for some battery manufacturers but not for others in the supply chain. Therefore, there’s

evidence to conclude that the technology and procedures exist for equipment manufacturers to manage battery SOC as well. Any change to a cell or battery by someone other than the original battery manufacturer could lead to additional risk to the air transport system. The shipper could verify the SOC limit through contractual conditions with their supplier, documentation, or physical verification, as appropriate. This verification may not be within the current business practice of some equipment distributors; however, experience indicates this verification is possible through adaptation of existing business practices. The current dangerous goods system is dependent on a level of trust in order to provide for efficient transport. Verification of an SOC requirement would therefore be consistent with how other dangerous goods transport provisions are verified once offered into the air transport system.

2.4.2 What we don't know

2.4.2.1 The industries producing and distributing electronic equipment containing or packed with lithium ion batteries is vast and ever expanding. We don't know every equipment configuration, application of use, market demand, customer performance demands, or inventory management practices. There is no known source to obtain that volume and detail of information. Rules of general applicability applied in the Technical Instructions largely reflect OEM practices. Lithium batteries and equipment offered for transport by secondary suppliers, non-OEM shippers, and end users introduce additional uncertainties including:

- a) The extent of secondary markets that may modify a battery in some way;
- b) If or how equipment distributors modify equipment containing lithium ion batteries;
- c) How the safety/stability of lithium ion batteries change with normal use or whether certain types of use, misuse or other actions impact the safety of equipment and the batteries that would render them unacceptable for transport;
- d) What additional risk these uncertainties introduce.

2.4.2.2 Further, it is challenging predict what additional types or applications of equipment might need to arrive at destination at a higher than 30% SOC, it might be appropriate to consider provisions to allow for the transport of equipment as needed where the risks are adequately managed.

2.5 LOWER SOC COULD LEAD TO CELL DEGRADATION

2.5.1 What we know

2.5.1.1 Previous discussions indicate that manufacturers regularly ship lithium ion battery powered products below 100% charge to maintain optimal product quality. Some expressed concern that batteries shipped at a 30% charge could self-discharge while in transport and storage. It has been stated in the past that over-discharged (below 0 volts) lithium batteries can lead to cell degradation and the potential thermal runaway during subsequent recharging. Battery over-discharge protection circuits and battery management systems prevent this occurrence by cutting off activity when the voltage falls below predetermined limits. One recent study involving cells and batteries of different form factors, cathode chemistries, and capacities show minimal to no loss of voltage after nine months of storage within a package. This indicates that transport and storage or relatively long periods do not create over-discharge conditions. Further, the use of air transport typically implies an urgency for delivery. See: [Journal of Electrochemical Society, Safety of Lithium-Ion Cells and Batteries at Different States-of-Charge](#)

2.5.2 What we don't know

2.5.2.1 We have no data to indicate if there are current lithium ion battery compositions or chemistries that would pose a safety concern when shipped at a reduced state of charge.

2.6 PROVISIONS TO FACILITATE TRANSPORT OF CERTAIN LIFESAVING/LIFE-SUSTAINING MEDICAL DEVICES

2.6.1 What we know

2.6.1.1 Some members expressed sympathy during DGP/28 for ensuring any amendments to the Technical Instructions do not negatively impact the ability to expeditiously deliver critical medical devices where needed. Most of the examples provided relate to implantable medical devices. Providing an exception for implantable medical devices could be considered based on the small size of the batteries. Such an exception could be included easily as the term implantable is self-limiting and would not require a definition that might lead to application to unintended articles. The way by which the Technical Instructions characterize the hazard potential for lithium ion batteries is to force the battery into thermal runaway. Data indicates a battery's application has nothing to do with the likelihood or severity of thermal runaway.

2.6.2 What we don't know

2.6.2.1 It has been difficult to obtain comprehensive and reliable data on the types of medical devices or the need for these devices to be received at destination at higher than 30% SOC. We have no data to indicate that a battery's intended use either positively or negatively impacts the safety of the battery during air transport – particularly a battery exposed to an external fire.

2.7 REVISITING ASSUMPTIONS FROM WHAT WE HAVE LEARNED

2.7.1 The Technical Instructions regulate packaged lithium batteries differently than lithium batteries packed with or contained in equipment. For example, packing instructions 967 for lithium ion batteries contained in equipment offer additional flexibility on the packaging permitted and do not include a state of charge limit as compared to packing instruction 965 for packaged lithium ion batteries. This flexibility is based largely on the assumption that equipment protects the batteries from mechanical damage, limits the quantities of spare cells and batteries when packed with equipment, and a requirement to protect equipment from accidental activation to mitigate identified hazards. Additional justification for regulating batteries packed with and contained in equipment differently than packaged batteries seems to be based on the following additional assumptions:

- a) The net mass of lithium ion cells or batteries is small compared to the net mass of equipment;
- b) The batteries contained in equipment are effectively separated from each other reducing the likelihood of thermal runaway propagation; and
- c) The number of batteries per package is smaller compared to packaged battery shipments.

2.7.2 Recognizing these assumptions informed decisions of the Panel in the development of current requirements, the types of devices in use during that time were predominately notebook computers, cameras, and portable telephones. Batteries contained in those devices were primarily user replaceable, with hard outer casings containing cylindrical cells. More recently, the types of devices containing lithium batteries has evolved in include tablet computers, e-cigs, and outdoor power equipment. Batteries for consumer devices are now dominated by higher energy pouch cells with a flexible case permitting lighter, slimmer, more powerful devices. Also, the volume of shipments has increased dramatically, including large consignments of equipment containing batteries. This evolution warrants a review of the underlying assumptions to ensure they remain valid.

议程项目 5： 在附件 18 中明确国家监督责任（编号：工作卡 DGP.005.04）**5.1 拟议修订附件 18 以明确国家在危险物品安全航空运输方面的责任（DGP/29-WP/4 号文件）**

5.1.1 会议审查了危险物品专家组附件 18 工作组（DGP-WG/附件 18）和前危险物品专家组报告工作组（DGP-WG/报告）制定的附件 18 修订草案。专家组数年来一直致力于附件 18 的修订，首先拟定了各种条款，以期提高各国收集和分析危险物品安全数据及共享安全信息的能力，以便可以在全球范围内用其确定强化安全的必需行动。专家组通过拟定关于安全数据收集和处理系统及其辅助指导材料的一个新章节，于 2019 年完成了这项工作（见 DGP/27 会议报告建议 5/1（2019 年 9 月 16 日至 20 日，蒙特利尔））。但是，其结果已被搁置，有待进一步开展工作，明确国家在危险物品安全航空运输方面的责任。

5.1.2 数据收集和分析工作表明，附件 18 缺乏明确性和足够的细节，无法有效概述国家在危险物品安全航空运输方面的责任以及危险物品与其他航空活动之间责任的相互关系。附件 18 最初是在 1970 年代和 1980 年代初制定的，旨在为危险物品的安全航空运输提供广泛的规定，并在《技术细则》中提供更详细的要求。此后，专家组的大部分工作都是维护《技术细则》，该《细则》针对的是托运人和航空运营人，几乎不关注附件 18 和国家方面的责任。《技术细则》的侧重领域对于日常运行使用是必要的，并且有效地确保了危险物品能够安全地进行航空运输，但随着航空货运量的增长、所运输危险物品种类的变化和近年来供应链复杂程度的加剧，需要一个更强大、更积极主动的框架来应对不断演变的安全风险。现已对运营人的规定进行了修订，以通过附件 18 的一个注释反映这些变化，澄清运营人安全管理体系的范围包括危险物品运输，并在附件 6 —《航空器的运行》第 I 部分 — 国际商业航空运输 — 飞机和第 III 部分 — 国际运行 — 直升机中包含了关于货舱安全的一个新章节，其中要求运营人对货舱内的物品运输进行特定的安全风险评估。但是，国家层面却没有采取任何措施来处理航空货运系统的变化。对附件 18 的拟议修订旨在处理这一问题。

5.1.3 对附件 18 的修订载于本议程项目报告的附录 B。这是一项重大修订，但专家组成员认为这是一项必要修订，它将显著改善各国管理危险物品安全航空运输方式，并最终建立一个更加稳健和安全的全球航空货运系统。本议程项目报告的附录 A 逐章概述了修订提案。

5.1.4 同时，专家组正在制定指导材料，以支持实施经修订的附件 18。向各国提供的有关危险物品安全航空运输的指导，传统上已包含在《危险物品安全航空运输技术细则补篇》（Doc 9284SU 号文件）当中。但是，该文件的目的是补充或者说是更深入地说明《技术细则》所包含的基本信息，而国家的责任比这要广泛得多。因此，专家组建议将指导材料纳入一项新的手册中。专家组审议了是否应在该附件附篇中提供一些材料，并认识到这可以为各国提供更大的可见性。但其结论是，大部分材料对于附篇而言过于详细，更好的做法是至少作为第一步将其全部放在一处。一旦经修订的版本达到某种成熟度，则高级别指南可被认为适合纳入附件的附篇当中。

5.1.5 在拟定修订的过程中，与对危险物品具有影响的其他航空部门的相关专家进行了非正式协调。与安全管理、运行、适航性、航空安保、简化手续和法律专家的正式协调将在 DGP/29 会议之后进

行。专家组获悉，空中航行委员会对修订的初步审查要到 2024 年秋季才会安排进行。这给了专家组时间以彻底审查协调过程所提供的反馈。专家组商定在协调过程后召开虚拟会议，以便根据收到的意见对修订进行精细调整。

5.2 建议

5.2.1 根据上述讨论，会议拟定了以下建议：

RSPP

建议 5/1 — 修订附件 18 以明确国家在危险物品安全航空运输方面的责任
根据本议程项目报告附录 B 所示对附件 18 进行修订。

**APPENDIX A TO THE REPORT ON AGENDA ITEM 5
(English only)**

CHAPTER-BY-CHAPTER OVERVIEW OF THE PROPOSED AMENDMENT TO ANNEX 18

Foreword

The foreword was amended to better describe the relationship between Annex 18 and the Technical Instructions, the amendment process for the Technical Instructions, and available guidance material.

1. CHAPTER 1 — DEFINITIONS

1.1 New definitions for “supply chain”, misdeclared dangerous goods, and undeclared dangerous goods were developed. The panel considered it necessary to define these terms, because they were referred to in proposed Standards and Recommended Practices (SARPs) aimed at mitigating risks associated with dangerous goods being shipped that did not comply with the Technical Instructions. “Misdeclared” and “Undeclared” were already referred to Chapter 12 of Annex 18 — Dangerous goods accident and incident reporting, and there had been on-going queries from States and industry on what was meant by the terms. The definition for “supply chain” included entities that offer, handle or transport dangerous goods in cargo or mail and entities that cause to offer, handle or transport dangerous goods in cargo or mail. “Cause to offer, handle or transport” was added to capture entities such as freight forwarders who may offer general cargo containing undeclared dangerous goods. How to regulate uncertificated entities not intending to perform dangerous goods functions, particularly with respect to training requirements, had been a topic of debate on the panel for many years. Most panel members believed there should be mandatory requirements in the Annex and the Technical Instructions for these entities, but some States did not have legal authority over entities not performing any functions described in the Annex or the Technical Instructions. However, they did have legal authority over entities once they did perform a function, regardless of whether they were knowingly or unknowingly doing so. “Cause to offer, handle or transport” was intended to capture this concept. It was based on terminology already used in some States’ national legislation.

1.2 Definitions for cargo, civil aviation authority and remote-pilot-in-command, which were already defined in other ICAO documents, were added because they were referenced in the proposed new Annex 18.

1.3 Existing definitions for “cargo aircraft” and “passenger aircraft” were deleted, because they were considered unnecessary.

1.4 The definition for “dangerous goods accident” was modified to clarify that a dangerous goods accident is not restricted to an accident associated with the operation of an aircraft as was the case for an accident defined in accordance with Annex 13 — *Aircraft Accident and Incident Investigation*. The amended definition aligned with text in the definition for dangerous goods incident.

1.5 Editorial amendments to the definition for “Dangerous goods incident” were developed to improve the readability of the definition.

1.6 Amendments to the definitions for “dangerous goods” and “packaging” had been developed by DGP/26 and DGP/27, but were never adopted by Council, because the Air Navigation Commission (ANC) wanted them to be consolidated with more substantive amendments to Annex 18. The ANC had conducted a final review of the amendment to the definition for “dangerous goods” following State consultation (AN 209-02) and a preliminary review of the definition for “packaging” (AN 213-3). The definition for “packaging” had yet to be sent for State consultation.

1.7 The definition for “unit load device” was updated to reflect modern technology.

2. CHAPTER 2 — GENERAL

2.1 The title of Chapter 2 was changed from “Applicability” to “General” to better reflect its content, some of which was unrelated to applicability. General principles currently contained in other chapters were moved to this chapter, and SARPs were rearranged into what the panel considered to be a more logical order. Some SARPs and notes that were specific to the operator were moved to the chapter on operator responsibilities (Chapter 6).

2.2 A new Standard was added requiring each Contracting State to have the safety of the aircraft, its occupants, ground personnel, the public and the environment as its primary objective. The panel considered this important, because there were entities beyond the aviation system that performed dangerous goods transport by air functions whose objective was not typically safety.

2.3 The applicability SARPs were broadened from “international operations of civil aircraft” and “domestic civil aircraft operations” to “international civil aviation” and “domestic civil aviation” to ensure entities beyond the air operator were captured.

2.4 Articles and substances for which Annex 18 was not applicable, i.e. those listed in 2.4.1 of the current Annex 18, were moved to the applicability section.

2.5 The existing Standard in 2.4.2 requiring articles and substances intended as replacements or removed for replacement for those excepted from Annex 18 in accordance with 2.4.1 to be transported in accordance with the Annex was moved to the chapter on operator responsibilities (Chapter 6), recognizing this was an operator responsibility. A note referring to the Standard in Chapter 6 was added to Chapter 2.

2.6 The panel considered the exception from the Annex for articles and substances carried by passengers and crew contained in 2.4.3 to be inappropriate given that they were not excepted from the Annex. They were forbidden unless specifically permitted in accordance with the Technical Instructions, and there were specific criteria for allowing them. The exception was therefore removed, and a new Standard was added under “Dangerous goods permitted for transport by air” related to passengers and crew in the “Limitation on the transport of dangerous goods by air” section (see paragraph 2.8 below).

2.7 The Standard making the Technical Instructions binding on a State was modified to refer to entities in the supply chain, passengers and crew members to make who needed to comply with them clear.

2.8 The panel considered the limitations on the transport of dangerous goods by air contained in Chapter 4 of existing Annex 18 to be part of the general principles and framework for States to regulate dangerous goods. They were therefore moved to Chapter 2. A distinction was made between dangerous

goods transported as cargo or mail and dangerous goods carried by passengers or crew members. The panel considered it necessary to do this, because the regulatory requirements for each was very different.

2.9 SARPs related to States notifying ICAO of difficulties encountered in the application of the Technical Instructions, the appropriate national authority for ensuring compliance with Annex 18, and variations from the Technical Instructions were moved to a new Chapter 3 — Provision of information to ICAO (see paragraph 3 below). The panel proposed deleting the recommendation for the State of the Operator to take necessary measures to ensure that ICAO was notified of operator variations. A very small number of operator variations were reported to ICAO, and updates to already reported variations were not always provided. Users of the Technical Instructions could therefore not depend on what was published. Operator variations were more reliably reported to industry and included in industry regulations.

3. **CHAPTER 3 — PROVISION OF INFORMATION TO ICAO**

3.1 A new chapter capturing all existing SARPs that required various types of information to be provided to ICAO was added. It included:

- a) the recommendation for States to inform ICAO of difficulties encountered in the application of the Technical Instructions (2.2.2 of current Annex 18);
- b) the requirement for each State to specify an appropriate authority within its administration responsible for ensuring compliance with Annex 18 (2.7 of current Annex 18); and
- c) the requirement for States to notify ICAO of variations from the Technical Instructions (2.5.1 of current Annex 18).

4. **CHAPTER 4 — STATE SAFETY MANAGEMENT RESPONSIBILITIES**

4.1 A new chapter on State safety management responsibilities specific to dangerous goods was developed. Having a common understanding of safety was a particular challenge for dangerous goods transport because of the number of entities involved, many existing outside the aviation system. The chapter was developed to make it clear that transporting dangerous goods was an integral part of the State safety programme (SSP) required by *Annex 19 — Safety Management*. It was divided into four sections, each corresponding to one of the four components of an SSP. Standards and Recommended Practices (SARPs) were developed only when there was a need to elaborate on Annex 19 requirements to capture dangerous goods-specific responsibilities. Several notes to specific guidance that would be included in the new manual supporting States in implementing Annex 18 were added. An overview of the new chapter is provided below.

4.2 Several new and modified SARPs were included under State safety risk management:

- a) A new SARP was added requiring each Contracting State to implement documented processes and procedures to ensure that individuals and organizations performing activities related to the transport of dangerous goods met established requirements before being permitted to exercise the privileges of an exemption or an approval. The

panel believed this new SARP, coupled with guidance material that would be included in the new manual (see paragraph 5.1.4 of this report), would lead to a safer and more effective exemption and approval system globally.

- b) SARPs related to investigating dangerous goods incidents, dangerous goods accidents, and occasions when undeclared or misdeclared dangerous goods were discovered in cargo or mail contained in current Chapter 12 of Annex 18 were captured in a section on dangerous goods safety investigations. The SARPs were expanded to include occasions when dangerous goods not permitted in passenger or crew baggage were discovered and other safety issues. The existing provisions included a recommended practice for investigating domestic occurrences. The proposed Standards did not distinguish between domestic or international occurrences.
- c) A recommendation for States to participate in cooperative efforts with other States concerning violations of dangerous goods regulations in current Chapter 11 of Annex 18 was moved to the safety risk management section. The panel considered cooperation of States when conducting safety investigations of an international nature to be critical for the resolution of dangerous goods safety issues. The recommendation was therefore upgraded to a Standard. The existing recommendation was supplemented with examples of what might be considered cooperative efforts. The panel proposed deleting these examples as it considered it more appropriate for them to be included in the new guidance document to support implementation of Annex 18.
- d) SARPs were added requiring States to include the supply chain in their hazard identification, safety risk assessment and safety risk management processes. Hazards throughout the supply chain could pose significant safety risks to aviation. Annex 6 obligated the operator to consider the supply chain in its safety risk management activities. Supply chains could impact multiple operators. It was therefore important for the State to identify and assess system-wide hazards.
- e) SARPs were added with the aim of ensuring dangerous goods not in compliance with the Technical Instructions were not transported in cargo or mail and dangerous goods not permitted to be carried by passengers or crew were not carried on board an aircraft as part of the State's safety risk management activities. Guidance on measures that could be taken to do this, including security screening, would be provided in the new guidance document to support implementation of Annex 18.
- f) SARPs related to surveillance were included in Chapter 11 of existing Annex 18. It required inspection, surveillance and enforcement procedures for all entities performing any dangerous goods function prescribed in a State's regulations. Requiring surveillance activities for all entities was impossible to implement given the vast numbers performing dangerous goods functions. Entities other than the operator and designated postal operator did not normally have a direct relationship with the State. Safety issues related to entities performing dangerous goods functions that were not subject to surveillance would be addressed through safety risk management activities. The Standard in Chapter 11 was therefore deleted. It was replaced with a note referring to guidance in the new document to support implementation of Annex 18. The guidance would be aimed at ensuring the State was aware how Annex 19 surveillance obligations applied to dangerous goods.

- g) SARPs related to State safety promotion were added to ensure activities extended beyond the aviation system. This was essential to the management of safety risks associated with the transport of dangerous goods, particularly the risk of non-compliance with dangerous goods regulations.

5. CHAPTER 5 — SAFETY OF THE SUPPLY CHAIN

5.1 A new chapter on the safety of the supply chain replaced four existing chapters dealing with preparing and offering dangerous goods for transport, i.e. Chapter 3 — Classification; Chapter 5 — Packing, Chapter 6 — Labelling and marking and Chapter 7 — Shipper's responsibilities. These four chapters pointed to the provisions of the Technical Instructions, and some provisions from the Technical Instructions were repeated in the Annex. The existing provisions did not directly state what was required of the State, and there did not appear to be any rationale for determining what should be repeated and what should simply be referred to. The new chapter clearly defined what was expected of the State, which was to ensure authorities were empowered to oversee and manage the safe transport of dangerous goods by air and the enforcement of regulations throughout the supply chain. It listed the functions for which regulations needed to be adopted and referred to applicable parts of the Technical Instructions where the detailed instructions were found. Terminology to capture entities not deliberately performing dangerous goods functions but nevertheless causing undeclared dangerous goods to enter the air transport system was added. The terminology was consistent with the language used in the new definition for the supply chain (see paragraph 1.1).

6. CHAPTER 6 — OPERATOR'S RESPONSIBILITIES

6.1 The existing chapter on operator's responsibilities was expanded to summarize in more detail what was required by the Technical Instructions. The panel believed this would create greater visibility to States and make the State of the Operator better able to assess an operator's ability to perform dangerous goods functions through the air operator certification process and during surveillance activities. The amendments distinguished between operators with and without specific approval to transport dangerous goods as cargo. The amendments proposed included:

- a) A new note was added at the beginning of the chapter specifying that the State was required to recognize an air operator certificate issued by another Contracting State as valid in accordance with the provisions for the surveillance of operations by a foreign operator in Parts I, III — International Operations — Helicopters and IV of Annex 6 (surveillance of a foreign operator). A simplified version of the note was included in existing Chapter 10 — Training programmes. The existing note was added to remind States that training programmes were subject to the approval of the State of the Operator and that training programmes of foreign operators were not subject to the State's approval. The existing note simply referenced the applicable Standard in Annex 6. The existing note was modified to describe the Standard and moved to the operator chapter because it applied to more than training.

- b) A new section was added specifying that dangerous goods could not be transported as cargo unless specifically approved to do so by the State in accordance with the applicable provisions of Annex 6, that an operator holding a specific approval to carry dangerous goods as cargo issued by the State could only do so in accordance with the specific approval, and that operators authorized to carry radioactive material must implement and maintain a radiation protection programme as specified in the Technical Instructions.
- c) A new section was added specifying what information needed to be provided in the Operations Manual or other appropriate manual. It distinguished between responsibilities applicable to all operators and additional responsibilities applicable to operators with a specific approval to transport dangerous goods as cargo. It included detailed dangerous goods-related SARPs currently in Annex 6, Part I, Chapter 14 and Part III, Chapter 12. The panel identified errors in the dangerous goods provisions in Annex 6 which led it to recommend removing the details from Annex 6 while maintaining the distinction between operators with and without a specific approval to transport dangerous goods as cargo with high-level references to the relevant parts of Annex 18 for each type of operator (see the report on Agenda Item 7). This would eliminate redundancy and reduce the risk of future errors in the dangerous goods provisions in Annex 6.
- d) A new Standard was added requiring the operator to implement procedures aimed at preventing the introduction of undeclared and misdeclared dangerous goods into air transport.
- e) References to remote-pilot-in-command were added wherever pilot-in-command was referenced to align with Annex 6, Part IV.
- f) Operator responsibilities related to providing information that were in Chapter 9 — Provision of information of existing Annex 18 were moved to this chapter with the goal of keeping all operator responsibilities in one location.

7. **CHAPTER 7. DANGEROUS GOODS CARRIED BY PASSENGERS AND CREW**

7.1 A new chapter devoted to passenger provisions was added. It focused on the need for States to adopt regulations prohibiting passengers and crew from carrying dangerous goods on board aircraft unless permitted in accordance with the Technical Instructions. It modified the existing Standard in Chapter 9 — Provision of information that required States to promulgate information to warn passengers of the types of dangerous goods forbidden to be carried to align with the more prescriptive requirement in the Technical Instructions that required airport operators to promulgate the information. It included a note referring to the similar requirement for the operator that was moved from Chapter 9 to Chapter 6 — Operator responsibilities.

8. **CHAPTER 8. TRANSPORT OF DANGEROUS GOODS BY POST**

8.1 A new chapter on the transport of dangerous goods by post was created to merge into one chapter the Standard for the civil aviation authority to approve the designated postal operator's dangerous goods training programme in existing 10.2.2 of Chapter 10 and the Standard in 11.4 of Chapter 11 for the civil aviation authority to approve the designated postal operator's procedures for controlling the introduction of dangerous goods in airmail. The new chapter distinguished between responsibilities applicable only to designated postal operators with a policy to allow dangerous goods in mail and those applicable to all designated postal operators. A new Standard was added to require the State's designated postal operators accepting mail in another State ensured procedures and training were in place in that State. The Standard was intended to address challenges with respect to extraterritorial offices of exchange (ETOE) or any similar business entities that might emerge.

9. **CHAPTER 9. TRAINING AND ASSESSMENT**

9.1 The panel replicated many of the dangerous goods training provisions from the Technical Instructions into the chapter on training in the Annex to provide greater visibility to States and to ensure States would be consulted when amendments were proposed. The panel considered this important because of the State's obligation to approve the dangerous goods training programme of the operator and the designated postal operator. Additional amendments proposed included:

- a) "Assessment" was added to the chapter title to reflect the critical role it played in ensuring personnel were competent to perform their dangerous goods functions.
- b) A new Standard establishing for which entity a dangerous goods training programme was required was added. The entities requiring a dangerous goods training programme were established in the Technical Instructions, and the panel had extensive discussions over several years on whether training programmes could be required for entities not intending to handle dangerous goods shipped by air. Most panel members wanted to mandate training for such entities, but this was not feasible in States that did not have oversight authority over entities not performing functions described in the Annex or the Technical Instructions. However, if an entity performed a function described in Annex 18 or the Technical Instructions, they were required to have been trained in these States regardless of whether they knowingly or unknowingly performed them. The proposed Standard was intended to capture this concept by stating that training programmes were required by any entity that offered, handled or transported dangerous goods by air or caused to offer, handle, or transport dangerous goods by air.
- c) The need for recurrent training and assessment within 24 months of previous training and assessment was one of the requirements moved from the Technical Instruction. Twenty-four months was established to reflect the fact that the regulations were modified at least once every two years through the biennial editions of the Technical Instructions. There were concerns that this could imply that training once every two years was sufficient to ensure competency was maintained. The provision was revised to focus on the need for supplemental training to ensure competency was maintained while still maintaining the minimum requirement for recurrent training and assessment within 24 months of previous training and assessment.

10. **CHAPTER 10. DANGEROUS GOODS SAFETY INTELLIGENCE**

10.1 Chapter 10 replaced reporting and investigation provisions in existing Chapter 12 of Annex 18. It was the output of work stemming from a request from the Air Navigation Commission (ANC) to develop a dangerous goods incident reporting system began following the Twenty-Third Meeting of the DGP and the First DGP Working Group of the Whole on Lithium Batteries Meeting (Montréal, 6 to 10 February 2012). The lithium battery working group had recommended that incidents involving lithium batteries be reported to ICAO for publishing on a publicly-accessible website. It was recognized that such information could be used as a tool for identifying causal factors and potential gaps in regulations. The ANC subsequently asked the Secretariat to consider developing a dangerous goods incident reporting system to extend beyond lithium batteries to all dangerous goods incidents and specified during its review of the DGP/25 Report that the system should be a management-oriented tool to identify gaps in regulations.

10.2 The panel recognized the vast amount of data that could potentially be collected from a global reporting system, the need for extensive analysis to generate useful information to identify potential dangerous goods-related safety issues, and the substantial resources that would be needed to do so. It questioned whether development of an effective global system was feasible. The panel concluded that the best approach would be to focus on developing provisions and supporting guidance material that would enable development of effective systems within each State and adding a requirement for States to report to ICAO whenever they identified through their data analysis systems dangerous goods-related safety issues which might have an impact on global safety. The proposed amendments to Annex 18 supported this goal while aligning with Annexes 19 and 13. Terminology for reporting and compliance provisions were aligned with existing provisions in Annex 19, Chapter 5 by adding references to Annex 19 instead of repeating provisions already required by that Annex. Annex 19 provisions were expanded in cases where further clarity was needed or where entities other than operators needed to be addressed. The panel concluded that this approach would strengthen the link between dangerous goods and State safety management responsibilities.

10.3 The panel completed the proposed amendment and supporting guidance material at its twenty-sixth and twenty-twenty-seventh meetings but recommended against seeking comments from Contracting States at that time in case further refinement was needed to align with the panel's larger task of clarifying State oversight responsibilities in Annex 18 (see DGP/26 Report on Agenda Item 6 and DGP/27 Report on Agenda Item 5). Accordingly, Chapter 10 has been refined since DGP/27 to ensure alignment with the over-all amendment proposal.

11. **CHAPTER 11. DANGEROUS SECURITY PROVISIONS**

11.1 Existing Chapter 13 was modified to include physical and cyber security of data provisions with respect to the processing of exemptions for the transport of high consequence dangerous goods and a requirement for security personnel to receive dangerous goods training.

**APPENDIX B TO THE REPORT ON AGENDA ITEM 5
(English only)**

**PROPOSED AMENDMENT TO ANNEX 18 — THE SAFE TRANSPORT
OF DANGEROUS GOODS BY AIR**

NOTES ON THE PRESENTATION OF THE PROPOSED AMENDMENT

The text of the amendment is arranged to show revisions as shown below:

~~Text to be deleted is shown in blue with a blue line through it.~~ (strikeout text)

text to be deleted

New text to be inserted is shown in red with red underline (redline text)

new text to be inserted

~~Text to be deleted is shown in blue with a blue line through it~~ (strikeout text) followed by the replacement text which is shown in red with red underline (redline text).

new text to replace existing text

Text moved from a different location is identified with a reference to the location it is moved from in a light-red shaded box immediately before the redline text in the new location.

text moved from a different location

Text that is moved to a different location is identified with a reference to the location it is moved to in a light-blue shaded box immediately before the strikeout text in the original location.

text moved to a different location

FOREWORD

Historical background

~~The provisions of Annex 18 govern the international transport of dangerous goods by air. The material in this Annex was~~ They were developed by the Air Navigation Commission in response to a need expressed by Contracting States for an internationally agreed set of provisions governing the safe transport of dangerous goods by air. They were adopted by Council on 26 June 1981 and became applicable on 1 January 1984.

Relationship with the *Technical Instructions for the Safe Transport of Dangerous Goods by Air* (Doc 9284)

~~Annex 18 specifies the broad Standards and Recommended Practices to be followed to enable dangerous goods to be carried safely. The broad provisions are amplified by the detailed specifications of the *Technical Instructions for the Safe Transport of Dangerous Goods by Air* (Doc 9284) (Technical Instructions). In order to assist in achieving compatibility with the regulations covering the transport of dangerous goods by other modes of transport, the~~ The provisions of this Annex the *Technical Instructions* are based on the Recommendations of the on the transport of dangerous goods for all modes of transport developed by the United Nations Committee of Experts on the Transport of Dangerous Goods Economic and Social Council's Committee of Experts on the Transport of Dangerous Goods and the Regulations for the Safe Transport of Radioactive Materials of the International Atomic Energy Agency. The intent of using this common base by all modes of transport is to allow cargo to be transferred safely and smoothly between air, sea, rail, and road modes. Modifications from these recommendations are made in the Technical to address specific aviation needs while keeping in the mind the need to ensure modal compatibility.

Relationship with *Status of the Technical Instructions for the Safe Transport of Dangerous Goods by Air* (Doc 9284)

~~The provisions of Annex 18 govern the international transport of dangerous goods by air. The broad provisions of this Annex are amplified by the detailed specifications of the *Technical Instructions for the Safe Transport of Dangerous Goods by Air* (Doc 9284). The detailed requirements of the Technical Instructions are considered binding on a State by virtue of 2.3.1.1 of this Annex unless it has notified a difference to this provision under Article 38 of the Convention.~~

Amendments to Annex 18 and the Technical Instructions

~~Annex 18 is intended to contain stable material requiring only minor amendments using the normal Annex amendment process. The Technical Instructions require more substantial and frequent amendments to keep up with day-to-day operational use. The significant growth and complexity in air cargo operations since Annex 18 was first adopted necessitates the implementation of the same proactive strategy to improve safety performance needed in other aviation sectors through the State safety programme (SSP). Provisions aimed at ensuring States integrate dangerous goods operations within their SSP were adopted by Council on ... 2025 through Amendment 13. The provisions provide clarity and sufficient detail to effectively outline States' responsibilities with respect to the safe transport of~~

dangerous goods by air and the interrelationship of responsibilities between dangerous goods and other aviation activities. In order that a comprehensive document may be available to States for implementation of the dangerous goods provisions prescribed by this Annex, an Attachment hereto describes the interrelationships between Annex 18 and other Annexes bearing on the safe transport of dangerous goods by air.

The Air Navigation established the Dangerous Goods Panel (DGP) and tasked it with maintaining the Technical Instructions. The DGP meets periodically to review comments received from States and interested international organizations, to consider any changed recommendations of the United Nations Committee or the IAEA, to address safety and facilitation issues specific to air transport and to prepare revised editions of the Technical Instructions. Amendments recommended by the DGP are published in panel meeting reports and made available on www.icao.int/safety/DangerousGoods.

Amendments recommended by the DGP are reviewed by the Air Navigation Commission and approved, issued and amended by the Council. Action taken by the Air Navigation Commission or the Council on the recommendations is published in the Supplement to DGP meeting reports and made available on www.icao.int/safety/DangerousGoods/.

A new edition of the Technical Instructions is published every two years. Amendments to the Technical Instructions during the specific period of applicability of an edition of the document may also be published if deemed necessary. Amendments during the specific period of applicability are made available on www.icao.int/safety/dangerous_goods.

Guidance

Guidance to States on the implementation of Annex 18 is contained in *Oversight and Management of the Safe Transport of Dangerous Goods by Air Manual (Doc xxxxx)*.

The Technical Instructions are supported by the *Supplement to the Technical Instructions for the Safe Transport of Dangerous Goods by Air (Doc 9284)*. The Supplement contains guidance to assist States when considering authorizations to transport dangerous goods by air that the Technical Instructions forbid under normal circumstances through approvals or exemptions.

Action by Contracting States

Notification of differences. The attention of Contracting States is drawn to the obligation imposed by Article 38 of the Convention by which Contracting States are required to notify the Organization of any differences between their national regulations and practices and the International Standards contained in this Annex and any amendments thereto. Contracting States are invited to extend such notification to any differences from the Recommended Practices contained in this Annex, and any amendments thereto, when the notification of such differences is important for the safety of air navigation. Further, Contracting States are invited to keep the Organization currently informed of any differences which may subsequently occur, or of the withdrawal of any differences previously notified. A specific request for notification of differences will be sent to Contracting States immediately after the adoption of each amendment to this Annex.

The attention of States is also drawn to the provisions of Annex 15 related to the publication of differences between their national regulations and practices and the related ICAO Standards and Recommended Practices through the Aeronautical Information Service, in addition to the obligation of States under Article 38 of the Convention.

In the specific case of 2.2.1 of this Annex, it should be noted that States are expected to file a difference only if they are unable to accept the binding nature of the Technical Instructions. Variations from the detailed provisions of the Technical Instructions are to be reported to ICAO for publication in that document as required by 2.5 of this Annex. Such detailed variations from the Technical Instructions will not be published with any other differences in a Supplement to this Annex and are not expected to be published under the provisions of Annex 15.

Promulgation of information. The establishment and withdrawal of any changes to facilities, services and procedures affecting aircraft operations provided in accordance with the Standards specified in this Annex should be notified and take effect in accordance with the provisions of Annex 15.

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INTERNATIONAL STANDARDS AND RECOMMENDED PRACTICES

CHAPTER 1. DEFINITIONS

When the following terms are used in this Annex, they have the following meanings:

Approval. An authorization granted by an appropriate national authority for:

- a) the transport of dangerous goods forbidden on passenger and/or cargo aircraft where the Technical Instructions state that such goods may be carried with an approval; or
- b) other purposes as provided for in the Technical Instructions.

Note.— In the absence of a specific reference in the Technical Instructions allowing the granting of an approval, an exemption may be sought.

Cargo. Any property carried on an aircraft other than mail and accompanied or mishandled baggage.

Note.— This definition differs from the definition of “cargo” given in Annex 9 — Facilitation.

<i>Origin:</i>	<i>Rationale:</i>
DGP/29	The term is referred to in Annex 18. The definition is replicated from the Technical Instructions.

~~**Cargo aircraft.** Any aircraft, other than a passenger aircraft, which is carrying goods or property.~~

<i>Origin:</i>	<i>Rationale:</i>
DGP/29	The term is not referred to in Annex 18.

Civil aviation authority (CAA). The governmental entity or entities, however titled, that are directly responsible for the regulation of all aspects of civil air transport, technical (i.e. air navigation and aviation safety) and economic (i.e. the commercial aspects of air transport).

<i>Origin:</i>	<i>Rationale:</i>
DGP/29	The term is referred to in Annex 18. The definition is replicated from the <i>Safety Oversight Manual</i> (Doc 9734).

Consignment. One or more packages of dangerous goods accepted by an operator from one shipper at one time and at one address, receipted for in one lot and moving to one consignee at one destination address.

Crew member. A person assigned by an operator to duty on an aircraft during a flight duty period.

Dangerous goods. Articles or substances which are capable of posing a risk/hazard to health, safety, property or the environment and which are shown in the list of dangerous goods in the Technical Instructions or which are classified according to those Instructions.

<i>Origin:</i>	<i>Rationale:</i>
DGP/26 AN Min. 207-5 AN Min. 209-2	Justification: The need was identified during work on harmonizing provisions of the Technical Instructions with the UN Recommendations on the Transport of Dangerous Goods for incorporation in the 2019-2020 Edition. The amendment corrected inaccurate use of the term “risk”. The definition in the Technical Instructions already aligns with the UN Model Regulations. The ANC conducted a final review of the amendment following State consultation. It was pointed out, and recognized by the Commission, that the amendment proposal was administrative in nature and, as such, should be consolidated with other Annex 18 amendment proposals which could imply a later applicability date than the currently indicated 7 November 2019. (AN Min 209-2).

Dangerous goods accident. An occurrence associated with and related to the transport of dangerous goods by air, not necessarily occurring on board an aircraft, which results in fatal or serious injury to a person or major property or environmental damage.

Note.— A dangerous goods accident may also constitute an aircraft accident as defined in Annex 13— Aircraft Accident and Incident Investigation.

<i>Origin:</i>	<i>Rationale:</i>
DGP/26 and DGP/29	Clarification that a dangerous goods accident is not restricted to an accident associated with the operation of an aircraft. The wording aligns with text in the definition for dangerous goods incident. It is important to capture accidents not associated with the operation of an aircraft because they could indicate a safety deficiency that might have resulted in an aircraft accident if the dangerous goods had been loaded on the aircraft. (see DGP/26 Report and DGP/26-IP/6)

Dangerous goods incident. An occurrence, other than a dangerous goods accident, associated with and related to the transport of dangerous goods by air, not necessarily occurring on board an aircraft, ~~which results in injury to~~ where:

- a) a person; ~~is injured~~;
- b) there is property or environmental damage;
- c) there is fire, breakage, spillage, leakage of ~~fluid~~ contents or radiation or there is other evidence that the integrity of the packaging has not been maintained; ~~Any; or~~
- d) ~~occurrence relating to the transport of dangerous goods which seriously jeopardizes~~ the safety of the aircraft or its occupants ~~is also deemed to constitute a~~ is jeopardized.

Note.— A dangerous goods incident may also constitute an aircraft incident as defined in Annex 13 — Aircraft Accident and Incident Investigation.

<i>Origin:</i>	<i>Rationale:</i>
DGP/26 and DGP/29	— Editorial amendments to improve readability (see DGP/26 Report and DGP/26-IP/6). — “fluid” is replaced with “contents” to include solids. — Note added to establish relationship between a dangerous goods incident and an aircraft incident under Annex 13. It is similar to the one added under “Dangerous goods accident”.

Designated postal operator. Any governmental or non-governmental entity officially designated by a Universal Postal Union (UPU) member country to operate postal services and to fulfil the related obligations arising from the acts of the UPU Convention on its territory.

Exception. A provision in this Annex which excludes a specific item of dangerous goods from the requirements normally applicable to that item.

Exemption. An authorization, other than an approval, granted by an appropriate national authority providing relief from the provisions of the Technical Instructions.

Flight crew member. A licensed crew member charged with duties essential to the operation of an aircraft during a flight duty period.

Misdeclared dangerous goods. Dangerous goods offered for transport by air that are identified to not be in accordance with the information provided on the dangerous goods transport document or other documentation, when applicable.

Note.— Dangerous goods identified by the operator during the acceptance check as not being in compliance with the applicable provisions of the Technical Instructions are not included in this definition.

<i>Origin:</i>	<i>Rationale:</i>
DGP/29	The term is referred to in Annex 18.

Operator. A person, organization or enterprise engaged in or offering to engage in an aircraft operation.

Overpack. An enclosure used by a single shipper to contain one or more packages and to form one handling unit for convenience of handling and stowage.

Note.— A unit load device is not included in this definition.

Package. The complete product of the packing operation consisting of the packaging and its contents prepared for transport.

Packaging. ~~Receptacles~~ One or more receptacles and any other components or materials necessary for the ~~receptacle~~ receptacles to perform ~~its~~ their containment ~~function~~ and other safety functions.

Note.— For radioactive material, see Part 2, paragraph 7.21.3 of the Technical Instructions.

<i>Origin:</i>	<i>Rationale:</i>
DGP/27 AN Min. 213-3	Recommended by DGP/27 (Recommendation 1/1). Harmonizes the definition with the one contained in the UN Recommendations on the Transport of Dangerous Goods and corrects an out-of-date reference in the note. The definition is also contained in the Technical Instructions and already aligns with the UN Model Regulations. The Air Navigation Commission made a preliminary review of Recommendation 1/1 and, noting the amendment was editorial in nature, agreed that it should be referred for comments to Contracting States and appropriate international organizations, together with the Commission's own comments and proposals thereon, only as part of a more substantive amendment to Annex 18. (AN Min. 213-3)

~~**Passenger aircraft.** An aircraft that carries any person other than a crew member, an operator's employee in an official capacity, an authorized representative of an appropriate national authority or a person accompanying a consignment or other cargo.~~

<i>Origin:</i>	<i>Rationale:</i>
DGP/29	The term is not referred to in Annex 18.

Pilot-in-command. The pilot designated by the operator, or in the case of general aviation, the owner, as being in command and charged with the safe conduct of a flight.

Remote pilot-in-command. The remote pilot designated by the operator as being in command and charged with the safe conduct of a flight.

<i>Origin:</i>	<i>Rationale:</i>
DGP/29	The term is referred to in Annex 18.

Safety management system (SMS). A systematic approach to managing safety, including the necessary organizational structures, accountabilities, policies and procedures.

Serious injury. An injury which is sustained by a person in an accident and which:

- a) requires hospitalization for more than 48 hours, commencing within seven days from the date the injury was received; or
- b) results in a fracture of any bone (except simple fractures of fingers, toes or nose); or
- c) involves lacerations which cause severe haemorrhage, nerve, muscle or tendon damage; or
- d) involves injury to any internal organ; or
- e) involves second or third degree burns, or any burns affecting more than 5 per cent of the body surface; or
- f) involves verified exposure to infectious substances or injurious radiation.

State of Destination. The State in the territory of which the consignment is finally to be unloaded from an aircraft.

State of Origin. The State in the territory of which the consignment is first to be loaded on an aircraft.

State of the Operator. The State in which the operator's principal place of business is located or, if there is no such place of business, the operator's permanent residence.

Supply chain. Includes any entity that:

- a) offers, handles or transports; or
- b) causes to offer, handle or transport;

dangerous goods in cargo or mail.

<i>Origin:</i>	<i>Rationale:</i>
DGP/29	Proposed amendment introduces new provisions for safety of the supply chain. The definition scopes the term.

Technical Instructions. The *Technical Instructions for the Safe Transport of Dangerous Goods by Air* (Doc 9284), approved and issued periodically in accordance with the procedure established by the ICAO Council.

Undeclared dangerous goods. Dangerous goods offered for transport by air where there is no dangerous goods transport document or other documentation, when permitted, describing the contents as containing dangerous goods or the package is not marked to identify the contents as containing dangerous goods, as required by the Technical Instructions.

<i>Origin:</i>	<i>Rationale:</i>
DGP/29	The term is referred to in Annex 18.

UN number. The four-digit number assigned by the United Nations Committee of Experts on the Transport of Dangerous Goods and on the Globally Harmonized System of Classification and Labelling of Chemicals to identify an article or substance or a particular group of articles or substances.

Unit load device (ULD). ~~Any type of freight container, or a combination of an aircraft pallet with a net, or and an aircraft pallet with a net over an igloo. Any type of freight container, aircraft container, aircraft pallet with a net, or aircraft pallet with a net over an igloo.~~ **A device for grouping and restraining cargo, mail and baggage for air transport. It is either an aircraft container, or a combination of an aircraft pallet with a net, or and an aircraft pallet with a net over an igloo. A ULD is designed to be directly restrained by the aircraft cargo loading system.**

Note 1.— An overpack is not included in this definition.

Note 2.— A freight container for radioactive material is not included in this definition (see Part 2, paragraph 7.1.3 of the Technical Instructions).

<i>Origin:</i>	<i>Rationale:</i>
DGP/29 and DGP- WG/23	The definition has been in the Annex since its first edition. It is also contained in the Technical Instructions. The wording refers to older terminology and to articles that are no longer used. The amendment modernizes the terminology. The addition of Note 2 is made for the sake of alignment with the definition in the Technical Instructions. It was added to the Technical Instructions to differentiate a freight container for radioactive material from a ULD, because the former has specific characteristics that do not necessarily apply to a ULD. It was never made The amendment will ensure this concept is clear and ensure alignment between the two documents.

CHAPTER 2. APPLICABILITY GENERAL

2.1 Objectives

Each Contracting State shall have as a primary objective in the transport of dangerous goods by air the safety of the aircraft, its occupants, ground personnel, the general public and the environment.

<i>Origin:</i>	<i>Rationale:</i>
DGP/29	The safe transport of dangerous goods by air is dependent on the diligence of entities both within and outside the aviation system. The primary objective when using aviation to transport or carry dangerous goods for those outside the aviation system is not typically the safety of the aircraft and its occupants. It is therefore important to make this the primary objective when it comes to the safe transport of dangerous goods by air in addition to those entities that could be impacted by dangerous goods by other modes (i.e. ground personnel, the general public and the environment). This SARP is based on 2.1.1 of Annex 17 — <i>Security</i> , another Annex that deals with entities outside the aviation system.

2.1.2 General Applicability

2.1.2.1 The Standards and Recommended Practices of this Annex shall be applicable to ~~all~~ international ~~operations of civil aircraft~~ aviation.

<i>Origin:</i>	<i>Rationale:</i>
DGP/29	<ul style="list-style-type: none"> a) “General” is removed for the sake of consistency with other Annexes. b) Applying the Annex to aviation rather than to the operation of the aircraft is intended to ensure that entities other than the operator that contribute to the safe transport of dangerous goods are covered by this Annex.

The following is moved from 2.3:

Recommendation.— ~~*In the interests of safety and of minimizing interruptions to the international transport of dangerous goods, Each Contracting States should also take the necessary measures to achieve compliance with apply the Standards and Recommended Practices contained in this Annex and the Technical Instructions for to domestic civil aircraft operations aviation.*~~

<i>Origin:</i>	<i>Rationale:</i>
DGP/29	<ul style="list-style-type: none"> a) The provision relates to the applicability of the Annex and the Technical Instructions to domestic civil aircraft operations. There is a current recommendation to take the necessary measures to achieve compliance with the Annex and the Technical Instructions to domestic transport, but it is currently located outside of the applicability section of Chapter 2 (2.3). It is therefore proposed to move the recommended practice under the international applicability SARP. b) “Each” is added before “Contracting State” for the sake of consistency.

	<p>c) The current recommendation refers to the Annex and the Technical Instruction. Removing the reference to the Technical Instructions is proposed as it is considered redundant, given that Annex 18 makes the document binding on a State.</p> <p>d) It is proposed to replace “to achieve compliance” with “apply” for the sake of clarity and consistency.</p> <p>e) Text referring to “the interests of safety and minimizing interruptions to the international transport of dangerous goods” is considered more appropriate as guidance material. It is therefore proposed to remove it from the recommended practice and to elaborate on the concept in a new guidance document to support the implementation of Annex 18 (<i>Oversight and Management of the Safe Transport of Dangerous Goods by Air Manual (Doc xxxxx)</i>).</p> <p>f) “to domestic aircraft operations” is replaced with “to domestic civil aviation” to align with the revision to the previous SARP for the same reason, i.e. to ensure that entities other than the operator that contribute to the safe transport of dangerous goods are covered.</p>
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The following is moved from 2.4.1:

~~2.4.1.2.2~~ Articles and substances which would otherwise be ~~classified~~ **classified** as dangerous goods but which are required to be aboard the aircraft in accordance with the pertinent airworthiness requirements and operating regulations, or for those specialized purposes identified in the Technical Instructions, shall be excepted from the provisions of this Annex.

The following is moved from 2.4.2:

~~2.4.2~~ *Note. — Where See Chapter 6 for the requirements applicable to the transport of articles and substances intended as replacements for those described in ~~2.4.1~~ 2.2.3 or which have been removed for replacement ~~are~~ when carried on an aircraft, they shall be transported in accordance with the provisions of this Annex except as permitted in the Technical Instructions.*

<i>Origin:</i>	<i>Rationale:</i>
DGP/29	<p>a) The provision in current 2.4.1 relates to the applicability of the Annex and the Technical Instructions, but it is currently located outside of the applicability section of Chapter 2. It is therefore proposed to move the Standard to this section, i.e. the applicability section.</p> <p>b) The current Standard in 2.4.2 requiring articles and substances classified as dangerous goods which are intended as replacements for those described in 2.4.1 and those removed for replacement to be transported in accordance with the Annex is proposed for deletion from this chapter because it is proposed to be captured in Chapter 6 — Operator Responsibilities. Chapter 6 is intended to outline the dangerous goods elements the State of the Operator needs to consider when authorizing an operator to conduct air transport operations. How an operator ensures that articles and substances classified as dangerous goods needing to be replaced or intended as replacements for those described in new 2.2.3 are transported safely is one of those elements. Addressing this in Chapter 6 instead of this chapter allows for a comprehensive list of elements to be considered. The note under 2.2.2 referring to the provision in Chapter 6 is proposed to emphasize that there are limits to the exception in 2.2.2.</p>

The following is moved to new 2.4.2.1:

~~2.1.2 Where specifically provided for in the Technical Instructions, the States concerned may grant an approval provided that in such instances an overall level of safety in transport which is equivalent to the level of safety provided for in the Technical Instructions is achieved.~~

The following is moved to new 2.4.2.2:

~~2.1.3 In instances:~~

~~a) of extreme urgency; or~~

~~b) when other forms of transport are inappropriate; or~~

~~c) when full compliance with the prescribed requirements is contrary to the public interest,~~

~~the States concerned may grant an exemption from the provisions of the Technical Instructions provided that in such instances every effort shall be made to achieve an overall level of safety in transport which is equivalent to the level of safety provided for in the Technical Instructions.~~

<i>Origin:</i>	<i>Rationale:</i>
DGP/29	It is proposed to move the approval and exemption provisions from the applicability section to the limitation on the transport of dangerous goods by air section because they are more associated with the latter than with applicability. Approvals and exemptions are already mentioned in that section, so keeping all the relevant SARPs together makes them more comprehensive.

~~2.1.4 For the State of Overflight, if none of the criteria for granting an exemption are relevant, an exemption may be granted based solely on whether it is believed that an equivalent level of safety in air transport has been achieved.~~

<i>Origin:</i>	<i>Rationale:</i>
DGP/29	The Standard in 2.1.4 is proposed for deletion as it is considered more appropriate to address its intent, which is not clear by the wording, in guidance material. The intent of the SARP is to address challenges faced by the State of Overflight when considering whether to grant an exemption when the criteria for granting it are not applicable to that State. The challenges faced by the State of overflight are transferred to applicants, who are often unable to acquire an exemption. Addressing the issue through guidance will allow for more comprehensive assistance to States on the subject.

Note 1 is moved to under 2.4.2.1 and Notes 2 and 3 are moved to under 2.4.2.2:

~~Note 1. For the purpose of approvals, "States concerned" are the States of Origin and the Operator, unless otherwise specified in the Technical Instructions.~~

~~Note 2. For the purpose of exemptions, "States concerned" are the States of Origin, Operator, Transit, Overflight and Destination.~~

~~— Note 3. — Guidance for the processing of exemptions, including examples of extreme urgency, may be found in the Supplement to the Technical Instructions (Part S 1, Chapter 1, 1.2 and 1.3).~~

<i>Origin:</i>	<i>Rationale:</i>
DGP/29	Note 1 is specific to approvals and Notes 2 and 3 are specific to the exemptions. It is proposed to move Note 1 under the provision for approvals (now 2.4.2.1) and Notes 2 and 3 under the provision for exemptions (now 2.4.2.2) to improve clarity.

~~— Note 4. — Refer to 4.3 for dangerous goods forbidden for transport by air under any circumstances.~~

<i>Origin:</i>	<i>Rationale:</i>
DGP/29	The note is necessary in the current Annex because the provisions for approvals and exemptions and the provisions for dangerous goods forbidden under any circumstance are in different sections of this chapter. This is no longer necessary, since all of these provisions are proposed for inclusion in the same location, i.e. the limitation on the transport of dangerous goods section.

Note 5 is moved to under the title of Chapter 6 (Operator's Responsibilities) as Note 4:

~~— Note 5. — It is not intended that this Annex be interpreted as requiring an operator to transport a particular article or substance or as preventing an operator from adopting special requirements on the transport of a particular article or substance.~~

<i>Origin:</i>	<i>Rationale:</i>
DGP/29	The note is moved to Chapter 6: Operator responsibilities as Note 4. The note is currently under the provisions for approvals and exemptions, but its application goes beyond these. Moving the note to Chapter 6 makes the provisions for operators more comprehensive.

2.2.3 Detailed instructions

2.3.1 Dangerous Goods Technical Instructions

2.2.12.3.1.1 Each Contracting State shall take ~~the necessary~~ measures ~~to~~ **aimed at ensuring entities in the supply chain, passengers, and crew members** achieve compliance with the detailed provisions contained in the Technical Instructions.

2.3.1.2 Each Contracting State shall also take the necessary measures to achieve compliance with any amendment to the Technical Instructions which may be published during the specified period of applicability of an edition of the Technical Instructions.

<i>Origin:</i>	<i>Rationale:</i>
DGP/29	a) The addition of a new heading in 2.3 is proposed to describe the intent of the Technical Instructions.

	<p>b) The current Standard could incorrectly be interpreted to imply that the State needs to comply with the detailed provisions contained in the Technical Instructions. It is the entities performing functions related to the transport of dangerous goods by air that need to achieve compliance. The proposed amendment makes who needs to comply with the Technical Instructions clear.</p> <p>c) Current 2.2.1 contains two Standards. Editorial amendment to separate it into two.</p>
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The following is moved to 4.3:

~~2.2.2 Recommendation.— Each Contracting State should inform ICAO of difficulties encountered in the application of the Technical Instructions and of any amendments which it would be desirable to make to them.~~

<i>Origin:</i>	<i>Rationale:</i>
DGP/29	It is proposed to move the requirement for States to inform ICAO of difficulties applying the Technical Instructions to a proposed new Chapter 3: Provision of information to ICAO. The new chapter is intended to contain all requirements related to providing ICAO with information in one place.

~~2.2.3~~**2.3.1.2 Recommendation.**— *Although an amendment to the Technical Instructions with an immediate applicability for reasons of safety may not yet have been implemented in a Contracting State, such State should, nevertheless, facilitate the movement of dangerous goods in its territory which are consigned from another Contracting State in accordance with that amendment, providing the goods comply in total with the revised requirements.*

The following is moved from 2.6:

~~2.6~~**2.3.1.3 Surface transport****Multimodal transport**

Recommendation.— ~~States~~ *Each Contracting State should ~~make provisions~~ take measures to enable dangerous goods intended for air transport and prepared in accordance with the ICAO Technical Instructions to be accepted for ~~surface~~ transport by other modes of transport to or from aerodromes.*

<i>Origin:</i>	<i>Rationale:</i>
DGP/29	<p>a) The amendment to the heading is proposed because multimodal transport is a common term in the dangerous goods world and makes the intent of the provision easier to understand.</p> <p>b) Editorial revisions are proposed for the sake of clarity and consistency.</p> <p>c) The references to “ICAO” is unnecessary as there is now a definition for “Technical Instructions”.</p> <p>d) It is proposed to move the recommendation from its current location to this location so that all provisions related to the Technical Instructions are in one place.</p>

2.4 Limitation on the transport of dangerous goods by air

The following is moved from 4.1:

4.1.2.4.1 Dangerous goods permitted for transport by air

2.4.1.1 Each Contracting State shall only permit the transport of dangerous goods as cargo or mail by air shall be forbidden except as established in this Annex and the detailed specifications and procedures provided in provisions of the Technical Instructions.

<i>Origin:</i>	<i>Rationale:</i>
DGP/29	<ul style="list-style-type: none"> a) Moved from Chapter 4 (Limitation on the transport of dangerous goods by air) to keep the general regulatory framework for transport of dangerous goods by air in one place. b) Editorial revisions to the Standard are proposed to improve clarity by aligning the wording with the header. c) “Each Contracting State” is added to reflect the fact that the SARP is directed at the State. d) The addition of a reference to cargo or mail is proposed to differentiate from passenger baggage in the next SARP (2.4.1.2). e) “specifications and procedures” is replaced with “provisions” for the sake of consistency with other parts of the Annex.

2.4.1.2 Each Contracting State shall only permit the carriage of dangerous goods by passengers or crew members when specifically permitted in accordance with Part 8 of the Technical Instructions.

<i>Origin:</i>	<i>Rationale:</i>
DGP/29	<ul style="list-style-type: none"> a) New Standard which replaces the exception from the Annex of specific articles and substances carried by passengers or crew members currently contained in 2.4.3 because dangerous goods carried by passengers and crew are not excepted from the Annex. They are forbidden unless specifically permitted in the Technical Instructions, and there are criteria for allowing them there. b) Having the provision here clarifies the distinction between dangerous goods carried as cargo and dangerous good carried by passengers and crew and the fact that they are both covered by the Annex

The following heading and Standard are moved from 4.2:

4.2.2.4.2 Dangerous goods forbidden for transport by air unless approved or exempted

~~The dangerous goods described hereunder shall be forbidden on aircraft unless exempted by the States concerned under the provisions of 2.1 or~~ Each Contracting State shall not permit the transport of dangerous goods identified in the Technical Instructions as being forbidden for transport in normal circumstances unless the provisions of the Technical Instructions indicate they may be transported under an approval granted by the ~~State of Origin~~ States concerned in accordance with 2.4.2.1 or an exemption granted by the States concerned in accordance with 2.4.2.2.

~~— a) — dangerous goods that are identified in the Technical Instructions as being forbidden for transport in normal circumstances; and~~

~~— b) — infected live animals.~~

<i>Origin:</i>	<i>Rationale:</i>
DGP/29	<p>a) Moved from Chapter 4 (Limitation on the transport of dangerous goods by air) to keep the general regulatory framework for transport of dangerous goods by air in one place.</p> <p>b) The addition of “ approved” in the heading is proposed because the SARP refers to both approvals and exemptions.</p> <p>c) “Each Contracting State shall not permit ...” added to reflect the fact that the SARP is directed at the State.</p> <p>d) Editorial amendments to clarify intent.</p> <p>e) The references to exemption and approval provisions have changed because it is proposed to move these provisions from the general applicability section this section.</p> <p>f) Reference to only State of Origin for an approval is inconsistent with what is currently in the general applicability section which includes the State of the Operator as part of the approval process. “States concerned” is explained under the specific provisions for approvals (2.4.2.1) and exemptions (2.4.2.2) below.</p> <p>g) Deleted “infected live animals” because this is covered by the Technical Instructions.</p>

2.4.2.1 Approvals

The following Standard is moved from 2.1.2:

~~2.1.2~~—Where specifically provided for in the Technical Instructions, the States concerned may grant an approval provided that in such instances an overall level of safety in transport which is equivalent to the level of safety provided for in the Technical Instructions is achieved.

<i>Origin:</i>	<i>Rationale:</i>
DGP/29	<p>a) Moved from the current general applicability section in 2.1.2 as it relates more to the limitation provisions than to applicability provisions.</p> <p>b) Addition of heading for the sake of clarity.</p>

The following noted is moved from 2.1 (below 2.1.4):

~~Note 1~~— For the purpose of approvals, “States concerned” are the States of Origin and the Operator, unless otherwise specified in the Technical Instructions.

<i>Origin:</i>	<i>Rationale:</i>
DGP/29	The note applies to the States concerned when issuing an approval. It is moved from under 2.1.4 (Note 1) so that it is directly below the approval provision.

2.4.2.2 Exemptions

The following Standard is moved from 2.1.3:

~~2.1.3~~—In instances:

- a) of extreme urgency; or

- b) when other forms of transport are inappropriate; or
- c) when full compliance with the prescribed requirements is contrary to the public interest,

the States concerned may grant an exemption from the provisions of the Technical Instructions provided that in such instances every effort shall be made to achieve an overall level of safety in transport which is equivalent to the level of safety provided for in the Technical Instructions.

<i>Origin:</i>	<i>Rationale:</i>
DGP/29	<ul style="list-style-type: none"> a) Moved from the current general applicability section in 2.1.3 as it relates more to the limitation provisions than to applicability provisions. b) Addition of heading for the sake of clarity.

The following note is moved from 2.1 (below 2.1.4):

Note 2.1.— For the purpose of exemptions, “States concerned” are the States of Origin, Operator, Transit, Overflight and Destination.

<i>Origin:</i>	<i>Rationale:</i>
DGP/29	The note applies to the States concerned when issuing an exemption. It is moved from under 2.1.4 (Note 2) so that it is directly below the exemption provision.

The following note is moved from 2.1 (below 2.1.4):

Note 3.— Guidance for the processing of exemptions, including examples of extreme urgency, may be found in the [Supplement to the Technical Instructions \(Part S-1, Chapter 1, 1.2 and 1.3\) Oversight and Management of the Safe Transport of Dangerous Goods by Air Manual \(Doc xxxxx\), Chapter yy.](#)

<i>Origin:</i>	<i>Rationale:</i>
DGP/29	The guidance for processing of exemptions is currently contained in the Supplement to the Technical Instructions, but it is proposed to move all guidance specific to States from the Supplement to a new manual so that all guidance is consolidated in one place. The note is updated accordingly.

The following heading and Standard are moved from 4.3:

4.3.2.4.3 Dangerous goods forbidden for transport by air under any circumstances

~~Articles and substances that are specifically identified by name or by generic description in the Technical Instructions as being forbidden for transport by air under any circumstances shall not be carried on any aircraft.~~

2.4.3.1 Each Contracting State shall forbid any article or substance to be transported by air under any circumstance if, as presented for transport, it is liable to explode, dangerously react, produce a flame or dangerous evolution of heat or dangerous emission of toxic, corrosive or flammable gases or vapours under conditions normally encountered in transport.

2.4.3.2 Each Contracting State shall not grant approvals or exemptions for articles and substances identified in 2.4.3.1.

Note.— Guidance on dangerous goods forbidden for transport under any circumstance is provided in Doc xxxx, Chapter yy.

<i>Origin:</i>	<i>Rationale:</i>
DGP/29	<p>a) Moved from Chapter 4 (Limitation on the transport of dangerous goods by air) to keep the general regulatory framework for transport of dangerous goods by air in one place.</p> <p>b) The current SARP in 4.3 refers to articles or substances specifically identified by name or by generic description in the Technical Instructions as being forbidden for transport under and circumstance. The Technical Instructions make it clear that it is not possible to list all dangerous goods that should be forbidden under any circumstance. It is therefore proposed to include an explanation of what cannot be safely transported on an aircraft in the SARP and to include guidance for determining this in the new document referred to in the note.</p> <p>c) States should not grant approvals or exemptions to transport such articles or substances. New 2.4.3.2 makes this clear.</p>

The following is moved to 2.2:

2.3—Domestic civil aircraft operations

~~— Recommendation.— In the interests of safety and of minimizing interruptions to the international transport of dangerous goods, Contracting States should also take the necessary measures to achieve compliance with the Annex and the Technical Instructions for domestic civil aircraft operations.~~

<i>Origin:</i>	<i>Rationale:</i>
DGP/29	The recommendation relates to the applicability of the Annex and the Technical Instructions to domestic civil aircraft operations. It is therefore proposed to move the recommended practice to the applicability section of this chapter (2.2.2).

The following is moved to 2.2.3:

2.4—Exceptions

~~— 2.4.1— Articles and substances which would otherwise be classed as dangerous goods but which are required to be aboard the aircraft in accordance with the pertinent airworthiness requirements and operating regulations, or for those specialized purposes identified in the Technical Instructions, shall be excepted from the provisions of this Annex.~~

<i>Origin:</i>	<i>Rationale:</i>
DGP/29	The SARP relates to the applicability of the Annex and the Technical Instructions. It is therefore proposed to move it to the applicability section of this chapter (2.2.3).

The following is moved to Chapter 6:

~~— 2.4.2— Where articles and substances intended as replacements for those described in 2.4.1 or which have been removed for replacement are carried on an aircraft, they shall be transported in accordance with the provisions of this Annex except as permitted in the Technical Instructions.~~

<i>Origin:</i>	<i>Rationale:</i>
DGP/29	This SARP is proposed to be captured in Chapter 6 — Operator Responsibilities. Chapter 6 is intended to outline the dangerous goods elements the State of the Operator needs to consider when authorizing an operator to conduct air transport operations. How an operator ensures that articles and substances classified as dangerous goods which are intended as replacements is one of those elements. Addressing this in Chapter 6 instead of this chapter allows for a comprehensive list of elements to be considered.

~~— 2.4.3 Specific articles and substances carried by passengers or crew members shall be excepted from the provisions of this Annex to the extent specified in the Technical Instructions.~~

<i>Origin:</i>	<i>Rationale:</i>
DGP/29	The exception for dangerous goods carried by passengers and crew is proposed for deletion because they are not excepted from the Annex. They are forbidden unless specifically permitted in the Technical Instructions, and there are criteria for allowing them there. A new SARP related to dangerous goods carried by passengers and crew is proposed for inclusion under Dangerous goods permitted for transport by air (see proposed 2.4.1) and a new chapter devoted to dangerous goods permitted for carriage by passengers and crew (Chapter 7).

The is moved to 3.2:

~~2.5 Notification of variations from the Technical Instructions~~

~~— 2.5.1 Where a Contracting State adopts different provisions from those specified in the Technical Instructions, it shall notify ICAO promptly of such State variations for publication in the Technical Instructions.~~

~~— Note. Contracting States are expected to notify a difference to the provisions of 2.2.1 under Article 38 of the Convention only if they are unable to accept the binding nature of the Technical Instructions. Where States have adopted different provisions from those specified in the Technical Instructions, they are expected to be reported only under the provisions of 2.5.~~

<i>Origin:</i>	<i>Rationale:</i>
DGP/29	The requirement for States to inform ICAO of State variations is proposed to be moved to a new Chapter 3: Provision of information to ICAO. The new chapter is proposed so that all requirements related to providing ICAO with information is in one place.

~~— 2.5.2 Recommendation. The State of the Operator should take the necessary measures to ensure that when an operator adopts more restrictive requirements than those specified in the Technical Instructions, the notification of such operator variations is made to ICAO for publication in the Technical Instructions.~~

<i>Origin:</i>	<i>Rationale:</i>
DGP/29	Few operator variations are reported to ICAO, and updates to already reported variations are not always provided. Users of the Technical Instructions cannot depend on these variations. Operator variations are more reliably reported to industry and included in industry regulations. It is therefore proposed that the recommendation be deleted.

The following is moved to 2.3.1.3:

~~2.6—Surface transport~~

~~**Recommendation.**—States should make provisions to enable dangerous goods intended for air transport and prepared in accordance with the ICAO Technical Instructions to be accepted for surface transport to or from aerodromes.~~

The following is moved to Chapter 4.1:

~~2.7—National authority~~

~~Each Contracting State shall designate and specify to ICAO an appropriate authority within its administration to be responsible for ensuring compliance with this Annex.~~

<i>Origin:</i>	<i>Rationale:</i>
DGP/29	The requirement for States to designate and specify to ICAO an appropriate authority within its administration to be responsible for ensuring compliance with this Annex is proposed to be moved to a new Chapter 3: Provision of information to ICAO. The new chapter is proposed so that all requirements related to providing ICAO with information is in one place.

~~CHAPTER 3. CLASSIFICATION~~

~~The classification of an article or substance shall be in accordance with the provisions of the Technical Instructions.~~

~~— Note. — The detailed definitions of the classes of dangerous goods are contained in the Technical Instructions. These classes identify the potential risks associated with the transport of dangerous goods by air and are those recommended by the United Nations Committee of Experts on the Transport of Dangerous Goods.~~

<i>Origin:</i>	<i>Rationale:</i>
DGP/29	The intent of this Standard is to ensure anyone preparing a package containing dangerous goods for transport classifies the hazards associated with the dangerous goods in accordance with the Technical Instructions. However, the Standard does not make this clear nor does it make the obligation the Standard places on a State clear. A new Chapter 5 on the safety of the supply chain is proposed which captures the intent and State obligation of this SARP and similar SARPs in current Chapters 5 (Packing), 6 (Labelling and marking) and 7 (Shipper's responsibilities).

CHAPTER 3. PROVISION OF INFORMATION TO ICAO

The following is moved from 2.7:

2.7.3.1 National authority

Each Contracting State shall designate and specify to ICAO an appropriate authority within its administration to be responsible for ensuring compliance with this Annex.

<i>Origin:</i>	<i>Rationale:</i>
DGP/29	a) Proposed to be moved from Chapter 2 to this chapter so that all SARPs related to providing information to ICAO are in one place. b) Some States have more than one authority responsible for ensuring compliance with this Annex, so “an appropriate authority” is replaced with “the authorities”.

The following is moved from 2.5:

2.5.3.2 Notification of variations from the Technical Instructions

~~2.5.1~~—Where a Contracting State adopts different provisions from those specified in the Technical Instructions, it shall notify ICAO promptly of such State variations for publication in the Technical Instructions.

Note.— ~~Each Contracting States are~~ *is* expected to notify a difference to the provisions of ~~2.2.1~~ 2.3.1.1 under Article 38 of the Convention only if they are unable to accept the binding nature of the Technical Instructions. Where States have adopted different provisions from those specified in the Technical Instructions, they are expected to be reported only under the provisions of ~~2.5~~ 3.2.

<i>Origin:</i>	<i>Rationale:</i>
DGP/29	Proposed to be moved from Chapter 2 to this chapter so that all SARPs related to providing information to ICAO are in one place.

3.3 Difficulties encountered in the application of the Technical Instructions

The following is moved from 2.2.2:

~~2.2.2~~—**Recommendation.**— *Each Contracting State should inform ICAO of difficulties encountered in the application of the Technical Instructions and of any amendments which it would be desirable to make to them.*

<i>Origin:</i>	<i>Rationale:</i>
DGP/29	a) Heading added to differentiate between other sections of this chapter b) Proposed to be moved from Chapter 2 to this chapter so that all SARPs related to providing information to ICAO are in one place.

~~CHAPTER 4.—LIMITATION ON THE TRANSPORT OF DANGEROUS GOODS BY AIR~~

The following is moved to 2.4.1:

~~4.1—Dangerous goods permitted for transport by air~~

~~The transport of dangerous goods by air shall be forbidden except as established in this Annex and the detailed specifications and procedures provided in the Technical Instructions.~~

The following is moved to 2.4.2:

~~4.2—Dangerous goods forbidden for transport by air unless exempted~~

~~The dangerous goods described hereunder shall be forbidden on aircraft unless exempted by the States concerned under the provisions of 2.1 or unless the provisions of the Technical Instructions indicate they may be transported under an approval granted by the State of Origin:~~

- ~~— a) dangerous goods that are identified in the Technical Instructions as being forbidden for transport in normal circumstances; and~~
- ~~— b) infected live animals.~~

The following is moved to 2.4.3:

~~4.3—Dangerous goods forbidden for transport by air under any circumstances~~

~~Articles and substances that are specifically identified by name or by generic description in the Technical Instructions as being forbidden for transport by air under any circumstances shall not be carried on any aircraft.~~

<i>Origin:</i>	<i>Rationale:</i>
DGP/29	<p>The SARPs currently in Chapter 4 for the limitation on the transport of dangerous goods are moved to Chapter 2 to keep the general regulatory framework for transport of dangerous goods by air in one place.</p> <p>It is proposed that Chapter 4 contain safety management provisions specific to dangerous goods.</p>

CHAPTER 4. STATE SAFETY MANAGEMENT RESPONSIBILITIES

<i>Origin:</i>	<i>Rationale:</i>
DGP/29	A new chapter on State safety management responsibilities specific to dangerous goods is proposed with the aim of ensuring all entities involved with the safe transport of dangerous goods are working towards the level of safety expected in aviation. Having a common understanding of safety presents challenges unique to dangerous goods transport because of the many entities involved, including regulatory authorities and industries outside the aviation system. The chapter is intended to make the fact that transporting dangerous goods is an integral part of the State safety programme required by Annex 19 and to ensure activities necessary to achieve targeted levels of safety specific to dangerous goods that go beyond what Annex 19 requires are covered. The structure of the chapter is based on the components of an SSP so that there are four sections, one for each component.

Note 1.— The provisions for a State Safety Programme contained in Chapter 3 to Annex 19 are applicable to this Annex. This chapter of Annex 18 contains specific State safety management responsibilities relevant to the safe transport of dangerous goods by air.

Note 2.— Guidance on an SSP is contained in the Safety Management Manual (SMM) (Doc 9859).

<i>Origin:</i>	<i>Rationale:</i>
DGP/29	Authorities involved with the safe transport of dangerous goods by air may not all be part of the aviation sector in some States. The notes are intended to ensure all are aware of the requirements for a State safety programme and the fact that the transport of dangerous goods by air is an integral part of it.

4.1 State safety policy, objectives and resources

Note 1.— See 5.1 for primary aviation legislation specific to the safe transport of dangerous goods by air.

Note 2.— See 5.2 and 8.1 for specific operating regulations specific to the safe transport of dangerous goods by air.

<i>Origin:</i>	<i>Rationale:</i>
DGP/29	SARPs related to primary aviation legislation and specific operator regulations specific to dangerous goods are proposed for inclusion in Chapter 5. References to these sections in Notes 1 and 2 are proposed for the sake of comprehensiveness.

Note 3.— Guidance on the establishment of authorities or government agencies supported by sufficient and qualified personnel and provided with adequate financial resources for the management of safety specific to dangerous goods is contained in Doc xxxx, Chapter yy.

Note 4.— Guidance on staffing, minimum qualification requirements and training for dangerous goods technical personnel involved in the regulation and oversight of transport of dangerous goods by air is contained in Doc xxxx, yyyy.

Note 5.— Guidance on coordination between the civil aviation authority and other appropriate national authorities that could have an impact on the transport of dangerous goods by air is contained in Doc xxxx, yyyy.

<i>Origin:</i>	<i>Rationale:</i>
DGP/29	The SSP elements highlighted by Notes 3 to 4 are covered by the existing SARPs in Annex 19, so there is no need for SARPs specific to dangerous goods. However, they highlight areas that have been identified as needing to be strengthened through safety oversight audits. The notes refer to guidance on how these elements apply to dangerous goods and how they can be established.

4.2 State safety risk management

4.2.1 Exemption and approval obligations

Each Contracting State shall implement documented processes and procedures to ensure that individuals and organizations performing activities related to the transport of dangerous goods meet the established requirements before they are allowed to exercise the privileges of an exemption or approval to conduct the relevant dangerous goods activity.

Note.— Guidance on the establishment of documented processes and procedures related to the granting of exemption and approval obligations is contained in Doc xxxx, Chapter yyyy.

<i>Origin:</i>	<i>Rationale:</i>
DGP/29 DGP/27	This Standard is aimed at ensuring States meet their responsibilities with respect to the granting of exemptions and approvals related to the transport of dangerous goods by air. The DGP has identified a need for additional guidance on the issuance of approvals and exemptions, particularly with respect to which entities the approval or exemption should be issued to and the relationship between the shipper, the operator and the State authorities processing them. Ensuring each Contracting State has documented process and procedures and providing guidance to assist them in developing them will help ensure States meet their exemption and approval obligations under Critical element 6.

4.2.2 Safety management system obligations

Note 1.— The transport of dangerous goods is included in the scope of the operator's safety management system (SMS).

Note 2.— See Annex 6 — Operation of Aircraft, Part I — International Commercial Air Transport — Aeroplanes, Chapter 15 and Part IV — International Operations — Remotely Piloted Aircraft Systems, Chapter 15 for SARPs concerning hazards associated with the transport of items in the cargo compartment, the conduct of a specific safety risk assessment, and the responsibilities for the transport of dangerous goods.

<i>Origin:</i>	<i>Rationale:</i>
DGP/29 DGP/27	The notes are aimed at ensuring the State is aware how safety management system obligations apply to dangerous goods. A new SARP is unnecessary because Note 1 is a statement of fact and Note 2 is covered by the SARPs in Annex 6.

4.2.3 Dangerous goods safety investigations

Moved from 12.1 and 12.2:

~~12.1 With the aim of preventing the recurrence of dangerous goods accidents and incidents, each Contracting State shall establish procedures for investigating and compiling information concerning such accidents and incidents which occur in its territory and which involve the transport of dangerous goods originating in or destined for another State. Reports on such accidents and incidents shall be made in accordance with the detailed provisions of the Technical Instructions.~~

~~12.2 **Recommendation.** With the aim of preventing the recurrence of dangerous goods accidents and incidents, each Contracting State should establish procedures for investigating and compiling information concerning such accidents and incidents which occur in its territory other than those described in 12.1. Reports on such accidents and incidents should be made in accordance with the detailed provisions of the Technical Instructions.~~

4.2.3.1 Each Contracting State shall establish a process to investigate dangerous goods accidents and dangerous goods incidents reported in accordance with Chapter 10 in support of the management of safety in the State.

<i>Origin:</i>	<i>Rationale:</i>
DGP/29	<p>This new Standard replaces the SARPs currently in 12.1 and 12.2 that require each Contracting State to establish procedures for investigating and compiling information concerning dangerous goods accidents and incidents which occur in its territory and involve the transport of dangerous goods originating or destined for another State and to report in accordance with the Technical Instructions and recommends the same when not originating or destined for another State.</p> <p>While accidents and incidents defined in accordance with Annex 13 apply to the operation of an aircraft, dangerous goods accidents and incidents defined in accordance with Annex 18 do not necessarily occur on board an aircraft. This SARP is intended to ensure that dangerous goods accidents or incidents that do not meet the criteria for accidents or incidents defined in Annex 13 are investigated. The investigation of an accident or incident that did not occur on board an aircraft is valuable because it may reveal safety deficiencies that need to be resolved to prevent another accident or incident and to prevent an incident from leading to an accident.</p> <p>The wording of the Standard is revised to:</p> <ol style="list-style-type: none"> a) align with the wording in Annex 19; b) require the establishment of a process to conduct safety investigations for all accidents and incidents involving the transport of dangerous goods that are reported to the State regardless of where they occurred; c) remove the reference to compiling information because this is covered in new Chapter 10 which is proposed to contain provisions related to safety intelligence.

Moved from 12.3:

~~12.3 With the aim of preventing the recurrence of instances of undeclared or misdeclared dangerous goods in cargo, each Contracting State shall establish procedures for investigating and compiling information concerning such~~

~~occurrences which occur in its territory and which involve the transport of dangerous goods originating in or destined for another State. Reports on such instances shall be made in accordance with the detailed provisions of the Technical Instructions.~~

~~12.4 **Recommendation.**— With the aim of preventing the recurrence of instances of undeclared or misdeclared dangerous goods in cargo, each Contracting State should establish procedures for investigating and compiling information concerning such occurrences which occur in its territory other than those described in 12.3. Reports on such instances should be made in accordance with the detailed provisions of the Technical Instructions.~~

4.2.3.2 Each Contracting State shall establish and implement a risk-based process for the investigation of:

- a) occasions when undeclared dangerous goods are discovered in cargo or mail;
- b) occasions when dangerous goods not permitted in passenger or crew baggage are discovered; and
- c) other safety issues

which are reported in accordance with Chapter 10 in support of the management of safety in the State.

<i>Origin:</i>	<i>Rationale:</i>
DGP/29	<p>This new Standard replaces the SARPs currently in 12.3 and 12.4 that require each Contracting State to establish procedures for investigating and compiling information concerning occurrences of undeclared or misdeclared dangerous in cargo which occur in its territory and involve the transport of dangerous goods originating or destined for another State and to report in accordance with the Technical Instructions and recommends the same when not originating or destined for another State.</p> <p>The new Standard is revised to:</p> <ul style="list-style-type: none"> a) emphasize the need for the process to be risk-based; b) require the establishment of the risk-based process for all occurrences of undeclared dangerous goods involving the transport of dangerous goods that are reported to the State regardless of where they occurred; c) expand the requirement to dangerous goods discovered in passengers and crew baggage that are not permitted and to other safety issues. d) remove the reference to compiling information because this is covered in new Chapter 10 which is proposed to contain provisions related to safety intelligence. <p>The expansion of the requirement to dangerous goods discovered in passengers and crew baggage is made to reflect a long-standing requirement in the Technical Instructions. Prohibited dangerous goods pose a safety risk if they are carried onboard aircraft by passengers and crew because they are either unaware of or deliberately ignore the requirements. Investigations should be conducted with the aim of reducing the likelihood of prohibited dangerous goods being carried by passengers and crew.</p>

Moved from 11.2:

Recommendation.— 4.2.3.2 Each Contracting State ~~should~~ shall participate in cooperative efforts with other Contracting States ~~concerning conducting safety investigations, as necessary, with the aim of resolving safety issues~~

~~and eliminating~~ violations of dangerous goods regulations, ~~with the aim of eliminating such violations. Cooperative efforts could include coordination of investigations and enforcement actions; exchanging information on a regulated party's compliance history; joint inspections and other technical liaisons; exchange of technical staff, and joint meetings and conferences. Appropriate information that could be exchanged include safety alerts, bulletins or dangerous goods advisories; proposed and completed regulatory actions; incident reports; documentary and other evidence developed in the investigation of incidents; proposed and final enforcement actions; and educational/outreach materials suitable for public dissemination.~~

Note 1.— See 10.4 for requirements related to the exchange of information.

Note 2.— Guidance on dangerous goods safety investigations can be found in Doc xxxx.

<i>Origin:</i>	<i>Rationale:</i>
DGP/29	Revised to expand beyond violations of dangerous goods regulations to include any safety issue. The cooperation of States when conducting safety investigations of an international nature is critical for the resolution of dangerous goods safety issues. The recommendation is therefore upgraded to a SARP. The text proposed for deletion is not a Standard or a Recommended Practice, but it is helpful so it will be incorporated in the new guidance document to support implementation of Annex 18.

4.2.4 Hazard identification and safety risk assessment

4.2.4.1 Each Contracting State shall establish and maintain a process to identify the State's system-level hazards associated supply chains from collected safety data.

4.2.4.2 Each Contracting State shall develop and maintain a process to assess safety risks associated with identified hazards introduced within supply chains.

<i>Origin:</i>	<i>Rationale:</i>
DGP/29	See rationale under 4.2.5.

4.2.5 Management of safety risks

4.2.5.1 Each Contracting State shall ensure that the mechanism for the resolution of safety issues required by Annex 19 addresses safety issues associated with the supply chain, passengers and crew.

4.2.5.2 Each Contracting State shall include preventing dangerous goods not in compliance with the Technical Instructions from being transported in cargo or mail as part of their safety risk management activities.

4.2.5.3 Each Contracting State shall implement measures with the aim of ensuring that entities within the supply chain have processes and procedures in place to identify dangerous goods in cargo or mail that are not in compliance with the Technical Instructions and to prevent them from being loaded on an aircraft.

4.2.5.4 Each Contracting State shall include preventing passengers and crew from taking dangerous goods on board an aircraft which they are not permitted to carry as part of their safety risk management activities.

4.2.5.5 Each Contracting State shall implement measures with the aim of ensuring that entities handling baggage can recognize dangerous goods not permitted to be carried by passengers and crew and prevent them from being carried on an aircraft when they are discovered.

Note.— Guidance on managing safety risks associated with dangerous goods is contained in Docs 10102 and Doc xxxx, Chapter yyyy.

<i>Origin:</i>	<i>Rationale:</i>
DGP/29	Annex 19 requires that States establish and maintain processes for hazard identification, assessing safety risks and managing safety risks. Hazards introduced throughout the supply chain may pose significant safety risks to aviation. Annex 6 obligates the operator to consider the supply chain in its safety risk management activities. Supply chains impact multiple operators. It is therefore important for the State to assess system-wide hazards and manage system-wide safety risks the aim of improving system-wide safety.

4.3 State Safety assurance

Moved from 11.1:

11.1—Inspection systems

~~Each Contracting State shall establish inspection, surveillance and enforcement procedures for all entities performing any function prescribed in its regulations for air transport of dangerous goods with a view to achieving compliance with those regulations.~~

~~— Note 1.— It is envisaged that these procedures would include provisions for:~~

~~— inspecting dangerous goods consignments prepared, offered, accepted or transported by the entities referred to in 11.1;~~

~~— inspecting the practices of the entities referred to in 11.1; and~~

~~— investigating alleged violations (see 11.3).~~

~~— Note 2.— Guidance on dangerous goods inspections and enforcement may be found in the Supplement to the Technical Instructions (Part S 5, Chapter 1 and Part S 7, Chapters 5 and 6).~~

Note.— Guidance on surveillance obligations and State safety performance specific to dangerous goods is contained in Doc xxxx, Chapter yyyy.

<i>Origin:</i>	<i>Rationale:</i>
DGP/29	The current Standard in 11.1 requires inspection, surveillance and enforcement procedures for all entities performing any dangerous goods function prescribed in a State's regulations. Requiring surveillance activities for all these entities is impossible to implement given the vast numbers performing dangerous goods functions and the fact that licence, certification, authorization or approval obligations do not apply to entities other than operators and designated postal operators. Inspection and enforcement procedures are covered by the SARPs for State safety risk management. The note provides guidance which will be incorporated in the new guidance manual. It will be aimed at ensuring the State is aware how Annex 19 surveillance obligations apply to dangerous goods.

4.4 State Safety promotion

4.4.1 Each Contracting State shall establish and manage safety promotional activities aimed at preventing passengers from carrying dangerous goods forbidden to be carried by passengers on board an aircraft.

Note.— See Chapter 7 for dangerous goods carried by passengers and crew.

4.4.2 Each Contracting State shall include preventing the introduction of dangerous goods in cargo and mail which are not in compliance with the provisions of this Annex and the Technical Instructions in the State safety promotion activities required by Annex 19.

4.4.3 Each Contracting State shall establish measures to improve safety awareness and promote a positive safety culture throughout the supply chain.

Note.— Guidance related to State safety promotion and a positive safety culture specific to the safe transport of dangerous goods is contained in Doc xxxx, Chapter yyy.

<i>Origin:</i>	<i>Rationale:</i>
DGP/29	State safety promotion specific to dangerous goods is needed for the same reasons it is needed in other aviation sectors. The new SARPs are needed because State safety promotion needs to extend beyond the aviation system. This is essential to the management of safety risks associated with the transport of dangerous goods, particularly the risk of non-compliance with dangerous goods regulations.

~~CHAPTER 5. — PACKING~~

~~5.1 — General requirements~~

~~Dangerous goods shall be packed in accordance with the provisions of this chapter and as provided for in the Technical Instructions.~~

~~5.2 — Packagings~~

~~— 5.2.1 Packagings used for the transport of dangerous goods by air shall be of good quality and shall be constructed and securely closed so as to prevent leakage which might be caused in normal conditions of transport, by changes in temperature, humidity or pressure, or by vibration.~~

~~— 5.2.2 Packagings shall be suitable for the contents. Packagings in direct contact with dangerous goods shall be resistant to any chemical or other action of such goods.~~

~~— 5.2.3 Packagings shall meet the material and construction specifications in the Technical Instructions.~~

~~— 5.2.4 Packagings shall be tested in accordance with the provisions of the Technical Instructions.~~

~~— 5.2.5 Packagings for which retention of a liquid is a basic function, shall be capable of withstanding, without leaking, the pressure stated in the Technical Instructions.~~

~~— 5.2.6 Inner packagings shall be so packed, secured or cushioned as to prevent their breakage or leakage and to control their movement within the outer packaging(s) during normal conditions of air transport. Cushioning and absorbent materials shall not react dangerously with the contents of the packagings.~~

~~— 5.2.7 No packaging shall be reused until it has been inspected and found free from corrosion or other damage. Where a packaging is reused, all necessary measures shall be taken to prevent contamination of subsequent contents.~~

~~— 5.2.8 If, because of the nature of their former contents, uncleaned empty packagings may present a hazard, they shall be tightly closed and treated according to the hazard they constitute.~~

~~— 5.2.9 No harmful quantity of a dangerous substance shall adhere to the outside of packages.~~

<i>Origin:</i>	<i>Rationale:</i>
DGP/29	The provisions in this chapter are details contained in the Technical Instructions. The SARPs are therefore redundant. Packing requirements are now covered more generally by the SARP proposed in new Chapter 5, 5.2.1 b) 3).

<i>Origin:</i>	<i>Rationale:</i>
DGP/29	A new chapter on the safety of the supply chain is proposed to more clearly outline the expectations of States. Current Annex 18 has three separate chapters that address responsibilities of entities involved with preparing and offering dangerous goods for transport. These are: Chapter 3, Classification; Chapter 5, Packing; Chapter 6: Labelling and marking; Chapter 7: Shipper's responsibilities. All of them point to the provisions of the Technical Instructions, with some provisions from the Technical Instructions repeated in the Annex. They do not directly state what is required of the State, and there does not appear to be any rationale for determining what should be repeated and what should simply be referred to. This new chapter clearly defines what is expected of the State, which is to adopt regulations directed at entities in the supply chain preparing, offering and transporting dangerous goods for transport by air. The new chapter lists the functions for which regulations are needed and refers to the applicable parts of the Technical Instructions where the detailed Instructions are found. Listing the functions provides the added benefit of an overview of how the Technical Instructions mitigate risk.

CHAPTER 5. SAFETY OF THE SUPPLY CHAIN

5.1 Primary aviation legislation (CE 1)

5.1.1 Each Contracting State shall promulgate laws that enable the oversight and management of the safety of the supply chain for the transport of dangerous goods by air, the resolution of safety issues and the enforcement of regulations through the relevant authorities established for that purpose.

5.2 Specific operating regulations

5.2.1 Each Contracting State shall adopt regulations to require, at a minimum, that:

- a) a person does not offer or cause to be offered for transport:
 - 1) articles or substances which are forbidden for transport in accordance with 2.4.3;
 - 2) articles or substances which are forbidden for transport in accordance with 2.4.2 unless permitted by the States concerned through an approval or exemption;

<i>Origin:</i>	<i>Rationale:</i>
DGP/29	4.1.2 a) and b) replaces part of current 7.1.

b) a person does not offer or cause to be offered dangerous goods for transport unless:

- 1) policies and procedures have been developed and provided to enable them to carry out the function for which they are responsible;

2) associated hazards are identified in accordance with the classification criteria of Part 2 of the Technical Instructions;

<i>Origin:</i>	<i>Rationale:</i>
DGP/29	4.1.2 b) 2) replaces current Chapter 3

3) risks associated with the identified hazards are mitigated at the package level through quantity limitations and packing and packaging requirements in accordance with Parts 3, 4 and 6 of the Technical Instructions;

<i>Origin:</i>	<i>Rationale:</i>
DGP/29	4.1.2 b)3 Replaces part of current 7.1 (Shippers' responsibilities — general requirements) and Chapter 5 (Packing).

4) hazard and handling information are communicated to entities in the supply chain in accordance with the marking, labelling and documentation requirements of Parts 3, 4 and 5 of the Technical Instructions;

<i>Origin:</i>	<i>Rationale:</i>
DGP/29	4.1.2 b) 4) replaces Chapter 6 (Labelling and Marking) and 7.2 (Dangerous goods transport document).

5) documentation is retained in accordance with the Technical Instructions;

<i>Origin:</i>	<i>Rationale:</i>
DGP/29	The need for documentation to be retained is required by the detailed provisions of the Technical Instructions. The documentation is evidence of compliance and provides important information for safety investigations.

6) in the case of radioactive material, a radiation protection programme has been established and is maintained in accordance with Part 1;6 of the Technical Instructions;

<i>Origin:</i>	<i>Rationale:</i>
DGP/29	The Technical Instructions contain provisions for a radiation protection programme by entities involved with the transport of radioactive material. There was never any reference to this in Annex.

c) operators accept, handle and transport dangerous goods in accordance with Chapter 6;

d) dangerous goods accidents, dangerous goods incidents and occasions when undeclared or misdeclared dangerous goods are discovered are reported in accordance with Chapter 10;

e) training and assessment is provided in accordance with Chapter 9; and

f) dangerous goods are not offered, caused to be offered or accepted for transport by mail unless specifically permitted in accordance with Chapter 8.

<i>Origin:</i>	<i>Rationale:</i>
DGP/29	5.2.1 c), d), e) and f) establish the need for the State to adopt regulations aimed at the operator, reporting, training and assessment and the mail. They refer to the associated SARPs in the Annex.

~~CHAPTER 6. LABELLING AND MARKING~~

~~6.1—Labels~~

~~Unless otherwise provided for in the Technical Instructions, each package of dangerous goods shall be labelled with the appropriate labels and in accordance with the provisions set forth in those Instructions.~~

~~6.2—Markings~~

~~—6.2.1—Unless otherwise provided for in the Technical Instructions, each package of dangerous goods shall be marked with the proper shipping name of its contents and, when assigned, the UN number and such other markings as may be specified in those Instructions.~~

~~—6.2.2—Specification markings on packagings. Unless otherwise provided for in the Technical Instructions, each packaging manufactured to a specification contained in those Instructions shall be so marked in accordance with the appropriate provisions of those Instructions and no packaging shall be marked with a packaging specification marking unless it meets the appropriate packaging specification contained in those Instructions.~~

~~6.3—Languages to be used for markings~~

~~—**Recommendation.**—In addition to the languages required by the State of Origin and pending the development and adoption of a more suitable form of expression for universal use, English should be used for the markings related to dangerous goods.~~

<i>Origin:</i>	<i>Rationale:</i>
DGP/29	The provisions in this chapter are details contained in the Technical Instructions. The SARPs are therefore redundant. Labelling and marking requirements are now covered more generally by the SARP proposed in new Chapter 5, 5.2.1 b) 4).

<i>Origin:</i>	<i>Rationale:</i>
DGP/29	This rational applies to all of Chapter 6. SARPs for the operator responsibilities have been expanded to include more details from the Technical Instructions. The SARPs also differentiate between operators with and without specific approvals to transport dangerous goods as cargo. Including more details in the Annex should allow the State of the Operator to better assess an operator's ability to perform dangerous goods functions through the AOC process and during surveillance activities.

Moved from Chapter 8:

CHAPTER ~~8~~6. OPERATOR'S RESPONSIBILITIES

Note 1.— Annex 19 includes safety management provisions for air operators. Further guidance is contained in the Safety Management Manual (SMM) (Doc 9859).

Note 2.— The carriage of dangerous goods is included in the scope of the operator's safety management system (SMS).

Moved from under 2.1.4, Note 5:

Note ~~5~~ 3.— It is not intended that this Annex be interpreted as requiring an operator to transport a particular article or substance or as preventing an operator from adopting special requirements on the transport of a particular article or substance.

<i>Origin:</i>	<i>Rationale:</i>
DGP/29	Moved from Chapter 2: Applicability. The note is currently under the provisions for approvals and exemptions, but its application goes beyond these. Moving the note to this chapter makes the provisions for operators more comprehensive.

Note 3.— The Each Contracting State is required to recognize as valid an air operator certificate issued by another Contracting State in accordance with 4.2.2 of Annex 6, Part I, 2.2.2 of Part III — International Operations — Helicopters and 4.2.3 of Part IV. This includes the specific approval to transport dangerous goods as cargo issued by another Contracting State.

<i>Origin:</i>	<i>Rationale:</i>
DGP/29	Moved from Chapter 10: Training programmes. The note currently in Chapter 10 was added to remind States that training programmes were subject to the approval of the State of the Operator and that training programmes of foreign operators were not subject to the State's approval. The existing note simply referenced the applicable Standard in Annex 6. The panel modified the note to describe the Standard and moved it to the operator chapter because it applied to more than training.

6.1 General

6.1.1 The operator shall not transport dangerous goods as cargo unless specifically approved to do so by the State of the Operator in accordance with the applicable provisions of Annex 6.

6.1.3 The operator with a specific approval to transport dangerous goods as cargo that includes the carriage of radioactive material shall develop, implement and maintain a radiation protection programme in accordance with the Technical Instructions.

6.2 Dangerous goods components of the Operations Manual

6.2.1 The operator shall develop and implement procedures in accordance with the Technical Instructions, which shall be documented in the operations or other appropriate manual available to flight crew, cabin crew and other employees, that address, as applicable, the transport of cargo and mail and the carriage of dangerous goods in passenger and crew baggage, aimed at ensuring that:

a) undeclared and misdeclared dangerous goods are identified and prevented from being transported as cargo or carried by passengers and crew;

Note.— This includes operator material classified as dangerous goods.

b) information on the transport of dangerous goods is displayed at cargo acceptance areas in accordance with the Technical Instructions;

c) passengers and crew are prevented from carrying dangerous goods either as or in carry-on baggage, as or in checked baggage, or on their person unless the dangerous goods are permitted in accordance with Part 8 of the Technical Instructions;

d) information is provided to passengers in accordance with Chapter 7;

e) the reporting requirements of 6.9 are fulfilled;

f) all personnel, including third-party personnel, involved in the acceptance, handling, loading and unloading of cargo, mail, passenger and crew baggage are informed of the operator's limitations with regard to the transport of dangerous goods;

g) articles and substances intended as replacements for those described in 2.2.3 or which have been removed for replacement are carried in accordance with this Annex and the detailed provisions of the Technical Instructions by an operator with specific approval to transport dangerous goods as cargo.

6.2.2 An operator with a specific approval to transport dangerous goods as cargo shall in addition:

a) develop and implement procedures in accordance with the Technical Instructions, which shall be documented in the Operations or other appropriate manuals available to flight crew, cabin crew and other employees, that address, as applicable, the carriage of dangerous goods in cargo, mail, passenger and crew baggage; and

b) ensure that all personnel, including third-party personnel, involved in the acceptance, handling, loading and unloading of cargo, mail, passenger and crew baggage are informed of the operator's specific approvals [and limitations] with regard to the transport of dangerous goods.

Moved from 8.1:

8.16.3 Acceptance for transport

6.3.1 The operator shall develop and implement procedures aimed at preventing the introduction of undeclared and misdeclared dangerous goods into air transport.

Note.— See 6.9 concerning the reporting of dangerous goods accidents, dangerous goods incidents and instances where undeclared or misdeclared dangerous goods are identified.

6.3.2 An operator with a specific approval to transport dangerous goods as cargo shall:

a) ~~An operator shall~~ develop and implement procedures to ensure that dangerous goods are not accepted ~~dangerous goods~~ for transport by air:

a)1) unless the dangerous goods are accompanied by a completed dangerous goods transport document, except where the Technical Instructions indicate that such a document is not required; and

b)2) until the package, overpack or freight container containing the dangerous goods has been inspected in accordance with the acceptance procedures contained in the Technical Instructions.

Note 1.— See Chapter 12 concerning the reporting of dangerous goods accidents and incidents.

Note 2.— Special provisions relating to the acceptance of overpacks are contained in the Technical Instructions.

8.2 Acceptance checklist

b) ~~An operator shall~~ develop and use an acceptance checklist as an aid to compliance with the provisions of ~~8.1 6.3.2 a)~~, except where the Technical Instructions indicate that such an acceptance checklist is not required.

Moved to 6.6:

8.3 Loading and stowage

~~Packages and overpacks containing dangerous goods and freight containers containing radioactive materials shall be loaded and stowed on an aircraft in accordance with the provisions of the Technical Instructions.~~

8.46.4 Inspection for damage or leakage

8.4.16.4.1 An operator shall develop and implement procedures to ensure that if evidence of damage or leakage is found, the area where the cargo or unit load device were stowed on the aircraft shall be inspected for damage or contamination by dangerous goods.

6.4.2 An operator with a specific approval to transport dangerous goods as cargo shall develop and implement procedures to ensure that:—

a) ~~P~~ackages and overpacks containing dangerous goods and freight containers containing radioactive materials shall be inspected for evidence of leakage or damage before loading on an aircraft or into a unit load device. Leaking or damaged packages, overpacks or freight containers shall not be loaded on an aircraft.

b) unit load devices containing packages of dangerous goods bearing a hazard label are identified in accordance with the Technical Instructions;

~~8.4.2 c)~~ A unit load devices ~~shall~~ are not ~~be~~ loaded aboard an aircraft unless the device has been inspected and found free from any evidence of leakage from, or damage to, any dangerous goods contained therein.

~~8.4.3 d)~~ Where any package of dangerous goods loaded on an aircraft that appears to be damaged or leaking, ~~is the operator shall~~ removed ~~such package~~ from the aircraft, or ~~arrange for~~ its removal by an appropriate authority or organization is arranged, and thereafter shall ensure that the remainder of the consignment is in a proper condition for transport by air and that no other package has been contaminated.

~~8.4.4 e)~~ Packages or overpacks containing dangerous goods and freight containers containing radioactive materials ~~shall be~~ are inspected for signs of damage or leakage upon unloading from the aircraft or unit load device. ~~If evidence of damage or leakage is found, the area where the dangerous goods or unit load device were stowed on the aircraft shall be inspected for damage or contamination.~~

Moved from 8.6:

8.6.5 Removal of contamination

8.6.1 An operator shall develop and implement procedures to ensure that:

a) Any hazardous contamination found on an aircraft as a result of leakage or damage to dangerous goods ~~shall be~~ is removed without delay.

~~8.6.2 b)~~ An aircraft which has been contaminated by radioactive materials ~~shall is~~ immediately ~~be~~ taken out of service and not returned to service until the radiation level at any accessible surface and the non-fixed contamination are not more than the values specified in the Technical Instructions.

Note.— The procedures of an operator without a specific approval to transport dangerous goods as cargo are applicable to contamination from the inadvertent transport of undeclared dangerous goods; and dangerous goods carried by passengers and crew.

Moved from 8.3:

8.3.6.6 Loading and stowage

An operator with a specific approval to transport dangerous goods as cargo shall develop and implement procedures to ensure that:

a) Packages, ~~and~~ overpacks and unit load devices containing dangerous goods and freight containers containing radioactive materials ~~shall be~~ are loaded and stowed on an aircraft in accordance with the provisions of the Technical Instructions.;

Moved from 8.7:

~~8.7.1 b)~~ Packages containing dangerous goods which might react dangerously one with another ~~shall~~ are not ~~be~~ stowed on an aircraft next to each other or in a position that would allow interaction between them in the event of leakage.;

~~— 8.7.2 Packages of toxic and infectious substances shall be stowed on an aircraft in accordance with the provisions of the Technical Instructions.~~

<i>Origin:</i>	<i>Rationale:</i>
DGP/26 AN Min. 209-2	Justification: The Standard in 8.7.2 is no longer necessary as it refers to detailed segregation requirements in the Technical Instructions which no longer exist. Segregation requirements for toxic and infectious substances were removed from the 2015-2016 Edition of the Technical Instructions (see paragraph 2.7.1.1 of the DGP/24 Report). The ANC conducted a final review of the amendment following State consultation. It was pointed out, and recognized by the Commission, that the amendment proposal was administrative in nature and, as such, should be consolidated with other Annex 18 amendment proposals which could imply a later applicability date than the currently indicated 7 November 2019. (AN Min 209-2).

~~8.7.3 c) Packages of containing radioactive materials shall be are~~ stowed on an aircraft so that they are separated from persons, live animals and undeveloped film, in accordance with the ~~provisions in the~~ Technical Instructions.

Moved from 8.8:

~~d) When packages containing dangerous goods subject to the provisions contained herein are~~ loaded in an aircraft, ~~the operator shall are~~ protected ~~the dangerous goods~~ from being damaged, and ~~shall secured such goods~~ in the aircraft in such a manner that will prevent any movement in flight which would change the orientation of the packages. ~~For packages containing radioactive materials, the securing shall be adequate to ensure that the separation requirements of 8.7.3 are met at all times.~~

Moved from 8.9:

~~e) Packages of dangerous goods bearing the “Cargo aircraft only” label shall be are~~ loaded in accordance with the ~~provisions in the~~ Technical Instructions; and

~~8.5 Loading restrictions in passenger cabin or on flight deck~~

~~f) Dangerous goods shall are~~ not ~~be~~ carried in an aircraft cabin occupied by passengers or on the flight deck of an aircraft, except in circumstances permitted by the ~~provisions of the~~ Technical Instructions.

Moved to 6.5:

~~8.6 Removal of contamination~~

~~— 8.6.1 Any hazardous contamination found on an aircraft as a result of leakage or damage to dangerous goods shall be removed without delay.~~

~~— 8.6.2 An aircraft which has been contaminated by radioactive materials shall immediately be taken out of service and not returned to service until the radiation level at any accessible surface and the non-fixed contamination are not more than the values specified in the Technical Instructions.~~

~~8.7— Separation and segregation~~

Moved to 6.6:

~~— 8.7.1— Packages containing dangerous goods which might react dangerously one with another shall not be stowed on an aircraft next to each other or in a position that would allow interaction between them in the event of leakage.~~

~~— 8.7.2— Packages of toxic and infectious substances shall be stowed on an aircraft in accordance with the provisions of the Technical Instructions.~~

~~— 8.7.3— Packages of radioactive materials shall be stowed on an aircraft so that they are separated from persons, live animals and undeveloped film, in accordance with the provisions in the Technical Instructions.~~

~~8.8— Securing of dangerous goods cargo loads~~

Moved to 6.6:

~~When dangerous goods subject to the provisions contained herein are loaded in an aircraft, the operator shall protect the dangerous goods from being damaged, and shall secure such goods in the aircraft in such a manner that will prevent any movement in flight which would change the orientation of the packages. For packages containing radioactive materials, the securing shall be adequate to ensure that the separation requirements of 8.7.3 are met at all times.~~

~~8.9— Loading on cargo aircraft~~

Moved to 6.6:

~~Packages of dangerous goods bearing the “Cargo aircraft only” label shall be loaded in accordance with the provisions in the Technical Instructions.~~

Moved from 9.1:

~~9.16.7~~ **Information to pilot-in-command or remote-pilot-in-command**

~~The operator of an aircraft in which dangerous goods are to be carried shall~~An operator with a specific approval to transport dangerous goods as cargo shall develop and implement procedures to ensure that when an aircraft is to transport dangerous goods as cargo, ~~provide~~ the pilot-in-command or remote-pilot-in-command, as applicable, is provided as early as practicable before departure of the aircraft with ~~written~~ information ~~as specified~~ in accordance with the Technical Instructions.

Moved from 9.2:

~~9.26.8~~ **Information and instructions to flight crew members Emergency procedures**

6.8.1 The operator shall develop and provide ~~such information in the Operations Manual as will enable the flight crew to carry out its responsibilities with regard to the transport of dangerous goods and shall provide~~ instructions to crew members as to the action to be taken in the event of an emergencies-emergency arising involving dangerous goods.

Moved from 9.5:

6.8.2 An operator with a specific approval to transport dangerous goods as cargo shall develop and implement procedures to address that if an in-flight emergency occurs, the pilot-in-command or remote-pilot-in-command shall, as soon as the situation permits, inform the appropriate air traffic services unit, for the information of aerodrome authorities, of any dangerous goods on board the aircraft, as provided for in the Technical Instructions.

Moved from 9.6:

~~9.6.16.8.3~~ 6.8.3 An operator with a specific approval to transport dangerous goods as cargo shall develop and implement procedures to ensure that if in the event of:

- a) an aircraft accident; or
- b) a serious incident where dangerous goods carried as cargo may be involved,

the ~~operator of the aircraft carrying dangerous goods as cargo shall provide information~~ information that was provided to the pilot-in-command or remote-pilot-in-command is provided, without delay, to emergency services responding to the accident or serious incident about the dangerous goods on board, ~~as shown on the written information to the pilot-in-command~~. As soon as possible, the operator shall also provide this information to the appropriate authorities of the State of the Operator and the State in which the accident or serious incident occurred.

~~9.6.26.8.4~~ 6.8.4 An operator with a specific approval to transport dangerous goods as cargo shall develop and implement procedures to ensure that if in the event of an aircraft incident, ~~the operator of an aircraft carrying dangerous goods as cargo shall~~, if requested to do so, provide the information that was provided to the pilot-in-command or remote-pilot-in-command is provided without delay to emergency services responding to the incident and to the appropriate authority of the State in which the incident occurred, about the dangerous goods on board, as shown on the written information to the pilot-in-command.

Note.— The terms “accident”, “serious incident” and “incident” are as defined in Annex 13.

6.9 Reporting

6.9.1 The operator shall develop and implement procedures to ensure that:

- a) where undeclared dangerous goods are discovered in cargo or mail, a report is provided to the appropriate authorities of the State of the Operator and the State in which this occurred;
- b) where dangerous goods not permitted by the Technical Instructions are discovered in passenger or crew baggage by the operator, or the operator is advised of such dangerous goods, that a report is submitted to the appropriate authority of the State in which this occurred.

6.9.2 An operator with a specific approval to transport dangerous goods as cargo shall in addition develop and implement procedures to ensure that:

- a) dangerous goods accidents and dangerous goods incidents are reported to the appropriate authorities of the State of the Operator and the State in which the dangerous goods accident or dangerous goods incident occurred; and
- b) where misdeclared dangerous goods are discovered in cargo or mail, a report is provided to the appropriate authorities of the State of the Operator and the State in which this occurred.

6.10 Retention of documents

6.10.1 An operator with a specific approval to transport dangerous goods as cargo shall develop and implement procedures to ensure that documents are retained in accordance with the Technical Instructions.

~~CHAPTER 7. SHIPPER'S RESPONSIBILITIES~~

~~7.1—General requirements~~

~~Before a person offers any package or overpack of dangerous goods for transport by air, that person shall ensure that the dangerous goods are not forbidden for transport by air and are properly classified, packed, marked, labelled and accompanied by a properly executed dangerous goods transport document, as specified in this Annex and the Technical Instructions.~~

<i>Origin:</i>	<i>Rationale:</i>
DGP/29	This SARP is covered by proposed new 5.2.1 a), 5.2.1 b) 2), 5.2.1 b) 3), 5.2.1 b) 4) and 5.2.1 b) 5)

~~7.2—Dangerous goods transport document~~

~~7.2.1 Unless otherwise provided for in the Technical Instructions, the person who offers dangerous goods for transport by air shall complete, sign and provide to the operator a dangerous goods transport document, which shall contain the information required by those Instructions.~~

~~7.2.2 The transport document shall bear a declaration signed by the person who offers dangerous goods for transport indicating that the dangerous goods are fully and accurately described by their proper shipping names and that they are classified, packed, marked, labelled, and in proper condition for transport by air in accordance with the relevant regulations.~~

<i>Origin:</i>	<i>Rationale:</i>
DGP/29	The provisions in 7.2 are details contained in the Technical Instructions. The SARPs are therefore redundant. The dangerous goods transport document is covered by proposed new 5.2.1 b) 4)

~~7.3—Languages to be used~~

~~**Recommendation.**—In addition to the languages which may be required by the State of Origin and pending the development and adoption of a more suitable form of expression for universal use, English should be used for the dangerous goods transport document.~~

<i>Origin:</i>	<i>Rationale:</i>
DGP/29	This recommendation is contained in by Part 5, Chapter 4, 4.1.6.3 of the Technical Instructions. It is therefore redundant.

<i>Origin:</i> DGP/29	<i>Rationale:</i> This rationale applies to all of Chapter 7. Currently Annex 18 excepts dangerous goods carried by passengers and crew to the extent specified in the Technical Instructions. Saying they are excepted is not entirely accurate because they are forbidden unless specifically permitted in the Technical Instructions, and there are criteria for allowing them there. The proposed new Standard in 2.4.1.2 makes this clear. This new chapter is proposed to make the responsibility of the State clear and to merge provisions related to the carriage of dangerous goods by passengers and crew together in one place.
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CHAPTER 7. DANGEROUS GOODS CARRIED BY PASSENGERS AND CREW

7.1 Limitations

Each Contracting State shall adopt regulations which prohibit passengers and crew from carrying dangerous goods as or in carry-on baggage, as or in checked baggage or on their person unless the dangerous goods are permitted in accordance with Part 8 of the Technical Instructions.

Moved from 9.3:

9.3.2 Provision of information to passengers

Each Contracting State shall ~~ensure that information is~~ adopt regulations to require that airport operators promulgated ~~information~~ information in such a manner that passengers are warned ~~as to~~ of the types of dangerous goods which they are forbidden from ~~transporting~~ carrying aboard an aircraft as provided for in ~~the~~ Part 7 of the Technical Instructions.

Note.— Requirements for the operator to provide information to passengers are contained in Chapter 6.

Moved to Chapter 6:

CHAPTER 8.— OPERATOR'S RESPONSIBILITIES

~~— Note 1.— Annex 19 includes safety management provisions for air operators. Further guidance is contained in the Safety Management Manual (SMM) (Doc 9859).~~

~~— Note 2.— The carriage of dangerous goods is included in the scope of the operator's safety management system (SMS).~~

8.1— Acceptance for transport

~~An operator shall not accept dangerous goods for transport by air:~~

- ~~— a) unless the dangerous goods are accompanied by a completed dangerous goods transport document, except where the Technical Instructions indicate that such a document is not required; and~~
- ~~— b) until the package, overpack or freight container containing the dangerous goods has been inspected in accordance with the acceptance procedures contained in the Technical Instructions.~~

~~— Note 1.— See Chapter 12 concerning the reporting of dangerous goods accidents and incidents.~~

~~— Note 2.— Special provisions relating to the acceptance of overpacks are contained in the Technical Instructions.~~

8.2— Acceptance checklist

~~An operator shall develop and use an acceptance checklist as an aid to compliance with the provisions of 8.1.~~

8.3— Loading and stowage

~~Packages and overpacks containing dangerous goods and freight containers containing radioactive materials shall be loaded and stowed on an aircraft in accordance with the provisions of the Technical Instructions.~~

8.4— Inspection for damage or leakage

~~— 8.4.1 Packages and overpacks containing dangerous goods and freight containers containing radioactive materials shall be inspected for evidence of leakage or damage before loading on an aircraft or into a unit load device. Leaking or damaged packages, overpacks or freight containers shall not be loaded on an aircraft.~~

~~— 8.4.2 A unit load device shall not be loaded aboard an aircraft unless the device has been inspected and found free from any evidence of leakage from, or damage to, any dangerous goods contained therein.~~

~~— 8.4.3 Where any package of dangerous goods loaded on an aircraft appears to be damaged or leaking, the operator shall remove such package from the aircraft, or arrange for its removal by an appropriate authority or organization, and thereafter shall ensure that the remainder of the consignment is in a proper condition for transport by air and that no other package has been contaminated.~~

~~— 8.4.4 Packages or overpacks containing dangerous goods and freight containers containing radioactive materials shall be inspected for signs of damage or leakage upon unloading from the aircraft or unit load device. If evidence of damage or leakage is found, the area where the dangerous goods or unit load device were stowed on the aircraft shall be inspected for damage or contamination.~~

~~8.5—Loading restrictions in passenger cabin or on flight deck~~

~~Dangerous goods shall not be carried in an aircraft cabin occupied by passengers or on the flight deck of an aircraft, except in circumstances permitted by the provisions of the Technical Instructions.~~

~~8.6—Removal of contamination~~

~~—8.6.1—Any hazardous contamination found on an aircraft as a result of leakage or damage to dangerous goods shall be removed without delay.~~

~~—8.6.2—An aircraft which has been contaminated by radioactive materials shall immediately be taken out of service and not returned to service until the radiation level at any accessible surface and the non-fixed contamination are not more than the values specified in the Technical Instructions.~~

~~8.7—Separation and segregation~~

~~—8.7.1—Packages containing dangerous goods which might react dangerously one with another shall not be stowed on an aircraft next to each other or in a position that would allow interaction between them in the event of leakage.~~

~~—8.7.2—Packages of toxic and infectious substances shall be stowed on an aircraft in accordance with the provisions of the Technical Instructions.~~

~~—8.7.3—Packages of radioactive materials shall be stowed on an aircraft so that they are separated from persons, live animals and undeveloped film, in accordance with the provisions in the Technical Instructions.~~

~~8.8—Securing of dangerous goods cargo loads~~

~~When dangerous goods subject to the provisions contained herein are loaded in an aircraft, the operator shall protect the dangerous goods from being damaged, and shall secure such goods in the aircraft in such a manner that will prevent any movement in flight which would change the orientation of the packages. For packages containing radioactive materials, the securing shall be adequate to ensure that the separation requirements of 8.7.3 are met at all times.~~

~~8.9—Loading on cargo aircraft~~

~~Packages of dangerous goods bearing the “Cargo aircraft only” label shall be loaded in accordance with the provisions in the Technical Instructions.~~

CHAPTER 8. TRANSPORT OF DANGEROUS GOODS BY POST

Moved from under 11.4, Note 1.

Note 4.— In accordance with the Universal Postal Union (UPU) Convention, dangerous goods are not permitted in mail, except as provided for in the Technical Instructions.

8.1 Designated postal operator's responsibilities

8.1.1 All designated postal operators accepting mail into air transport shall:

- a) establish and maintain a dangerous goods training programme in accordance with Chapter 9;
- b) develop and implement procedures for preventing the introduction of dangerous goods in mail when not in compliance with the provisions of this Annex and the Technical Instructions; and
- c) develop and implement procedures for the reporting of dangerous goods accidents, dangerous goods incidents and occasions when undeclared or misdeclared dangerous goods are discovered in mail offered for air transport in accordance with Chapter 10.

8.1.2 A designated postal operator with a policy to allow dangerous goods in mail shall:

- a) establish procedures for controlling the introduction of dangerous goods in mail into air transport; and
- b) not permit lithium batteries identified in Part 1;2.3 of the Technical Instructions in the mail into air transport unless the civil aviation authority of its State has issued a specific approval.

<i>Origin:</i>	<i>Rationale:</i>
DGP/29	Current Standard 11.4 requires procedures of designated postal operators for controlling the introduction of dangerous goods in mail into air transport be approved by the civil aviation authority of the State where the mail is accepted. Annex 18 does not require the designated postal operators to do anything. This new SARP outlines what the designated operator needs to do and what the civil aviation authority needs to consider when approving its procedures. It also adds a requirement for procedures for reporting of dangerous goods accidents, dangerous goods incidents and occasions when undeclared or misdeclared dangerous goods offered for air transport are discovered in mail. Data from these reports is necessary for the State's safety risk management activities.

8.1.3 Each Contracting State's designated postal operator accepting mail in another State shall establish procedures and training for the activities described by this chapter.

<i>Origin:</i>	<i>Rationale:</i>
DGP/29	The designated postal operator is responsible for its postal operators regardless of where they operate. The civil aviation authority needs to evaluate how the designated postal operator manages its operation in other States when approving the dangerous goods training programme.

Moved from 11.4:

11.48.2 Approval of procedures for controlling the introduction of dangerous goods by mail into air transport

The procedures of a State's designated postal operators ~~for controlling the introduction of dangerous goods in mail into air transport identified in 8.1~~ shall be approved by the State's civil aviation authority ~~of the State where the mail is accepted.~~

<i>Origin:</i>	<i>Rationale:</i>
DGP/29	The wording of the Standard was modified to remove any implication that the State must approve procedures of a foreign designated postal operator operating in its territory.

Current Note 1 is moved to top of this chapter:

~~— Note 1.— In accordance with the Universal Postal Union (UPU) Convention, dangerous goods are not permitted in mail, except as provided for in the Technical Instructions.~~

Note 1.— See Chapter 9 for approval of the designated postal operator's dangerous goods training programmes.

~~Note 2.— The Universal Postal Union has established procedures to control the introduction of dangerous goods into air transport through the postal services. The Universal Postal Convention embodies the rules applicable throughout the international postal service and the provisions concerning the letter-post and parcel-post services. The Universal Postal Union (UPU) requires that member countries ensure that their designated postal operators fulfil the obligations arising from the Universal Postal Convention. The Regulations to the Universal Postal Convention contain the rules of application necessary for the implementation of the Universal Postal Convention and reflect the ICAO Standards for the transport of dangerous goods in airmail (see the UPU Convention Manual Parcel Post Regulations and Letter Post Regulations).~~

<i>Origin:</i>	<i>Rationale:</i>
DGP/29	Amendments to the note were made to more accurately reflect the role of the Universal Postal Union.

~~Note 3.— Guidance for approving the procedures established by designated postal operators to control the introduction of dangerous goods into air transport may be found in the Supplement to the Technical Instructions (Part S-1, Chapter 3).~~

CHAPTER 9. — PROVISION OF INFORMATION

Moved to 6.7:

9.1 — Information to pilot in command

~~The operator of an aircraft in which dangerous goods are to be carried shall provide the pilot in command as early as practicable before departure of the aircraft with written information as specified in the Technical Instructions.~~

Moved to 6.8.1:

9.2 — Information and instructions to flight crew members

~~The operator shall provide such information in the Operations Manual as will enable the flight crew to carry out its responsibilities with regard to the transport of dangerous goods and shall provide instructions as to the action to be taken in the event of emergencies arising involving dangerous goods.~~

Moved to 7.2:

9.3 — Information to passengers

~~Each Contracting State shall ensure that information is promulgated in such a manner that passengers are warned as to the types of dangerous goods which they are forbidden from transporting aboard an aircraft as provided for in the Technical Instructions.~~

Captured in Chapter 6:

9.4 — Information to other persons

~~Operators, shippers or other organizations involved in the transport of dangerous goods by air shall provide such information to their personnel as will enable them to carry out their responsibilities with regard to the transport of dangerous goods and shall provide instructions as to the action to be taken in the event of emergencies arising involving dangerous goods.~~

9.5 — Information from pilot in command to aerodrome authorities

Moved to 6.8.2:

~~If an in flight emergency occurs, the pilot in command shall, as soon as the situation permits, inform the appropriate air traffic services unit, for the information of aerodrome authorities, of any dangerous goods on board the aircraft, as provided for in the Technical Instructions.~~

Moved to 6.8.3:

9.6—Information in the event of an aircraft accident or incident

~~— 9.6.1 In the event of:~~

~~— a) an aircraft accident; or~~

~~— b) a serious incident where dangerous goods carried as cargo may be involved,~~

~~the operator of the aircraft carrying dangerous goods as cargo shall provide information, without delay, to emergency services responding to the accident or serious incident about the dangerous goods on board, as shown on the written information to the pilot in command. As soon as possible, the operator shall also provide this information to the appropriate authorities of the State of the Operator and the State in which the accident or serious incident occurred.~~

~~— 9.6.2 In the event of an aircraft incident, the operator of an aircraft carrying dangerous goods as cargo shall, if requested to do so, provide information without delay to emergency services responding to the incident and to the appropriate authority of the State in which the incident occurred, about the dangerous goods on board, as shown on the written information to the pilot in command.~~

~~— Note. The terms “accident”, “serious incident” and “incident” are as defined in Annex 13.~~

<i>Origin:</i>	<i>Rationale for approach taken in amending the training provisions:</i>
DGP/29	Much of the dangerous goods training provisions currently in the Technical Instructions are proposed for inclusion in Annex 18. It is considered more appropriate to include training provisions in the Annex because the State's oversight responsibilities including the obligation to approve dangerous goods training programmes of the operator and may determine that approval is necessary for other entities in its State as well. Keeping the provisions in the Annex creates more visibility to the State and ensures they are consulted when amendments are proposed.

Moved from Chapter 10:

CHAPTER ~~10~~9. TRAINING PROGRAMMES AND ASSESSMENT

<i>Origin:</i>	<i>Rationale for approach taken in amending the training provisions:</i>
DGP/29	The title is modified to reflect the critical role assessment plays in ensuring personnel are competent to perform their dangerous goods functions.

10.19.1 Establishment of Dangerous goods training programmes

Note 1.— A training programme includes elements such as design methodology, assessment, initial and recurrent training, instructor qualifications and competencies, training records, and evaluation of its effectiveness.

<i>Origin:</i>	<i>Rationale for approach taken in amending the training provisions:</i>
DGP/29	The note is moved from the Technical Instructions. It is intended to make it clear that the State needs to consider more than a course syllabus when approving dangerous goods training programmes.

~~Initial and recurrent dangerous goods training programmes shall be established and maintained in accordance with the Technical Instructions.~~ 9.1.1 Each Contracting State shall require the establishment and maintenance of a dangerous goods training programme by any entity that:

- a) offers, handles, or transports dangerous goods by air; or
- b) causes to offer, handle, or transport dangerous goods by air.

<i>Origin:</i>	<i>Rationale:</i>
DGP/29	Who requires a dangerous goods training programme is currently established in the Technical Instructions. There have been extensive discussions on the Dangerous Goods Panel on whether training programmes can be required for entities not intending to handle dangerous goods by air. Entities such as freight forwarders play an important role in preventing undeclared dangerous goods from being introduced into the air cargo system, but they can only do this if they know how to identify them. A mandatory requirement for freight forwarders and other entities handling general cargo to be trained was introduced into the 2005-2006 Edition of the Technical Instructions, but some panel members had not interpreted

	the provisions to be mandatory because they referred to guidance. Whether mandating training for entities not intending to handle dangerous goods is feasible globally was raised by the DGP when it was revising the dangerous goods training provisions in the Technical Instructions to support a competency-based approach to training and assessment. Some States did not have oversight authority over entities not performing functions described in the Technical Instructions, so a mandatory requirement was not feasible in those States. However, entities performing functions described in the Technical Instructions are required to be trained in those States regardless of whether they knowingly or unknowingly perform them. The amendment is intended to capture this concept.
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Moved from under 10.2.1:

Note 1.— ~~A~~ Dangerous goods training programmes ~~are~~ is required for all operators regardless of whether ~~or not they are approved~~ the operator has been issued a specific approval to transport dangerous goods as cargo in accordance with Annex 6.

<i>Origin:</i>	<i>Rationale:</i>
DGP/29	Amendments to the note are proposed to refer to the specific approval required by Annex 6 and to specify that it applies to cargo. The need for all operators to have dangerous goods training programmes is established in new 9.1.1, but it is important to maintain this note for the same reason it was added through Amendment 12 to Annex 18. The need for clarification was based on safety oversight audit results that highlighted a lack of awareness of dangerous goods training requirements in relation to operators not approved to carry dangerous goods.

Note 2.— See Annex 6, Part I, Chapter 14; Part III, Chapter 12; and Part IV, Chapter 14 for the establishment of dangerous goods training programmes by the operator.

<i>Origin:</i>	<i>Rationale:</i>
DGP/29	The note is added to establish a connection between Annex 18 and 6 with respect to the operator's dangerous goods programme. The need for a dangerous goods training programme and for the details of it to be included in the operator's operations manual are provided in Annex 6.

9.1.2 Each Contracting State shall require the establishment and maintenance of a dangerous goods programme by its designated postal operators regardless of whether the designated postal operator allows the introduction of dangerous goods in mail.

10.2.9.2 Approval of training programmes

10.2.19.2.1 ~~The operator's~~ Dangerous goods training programme ~~for operators~~ shall be approved by the appropriate authority of the State of the Operator.

<i>Origin:</i>	<i>Rationale:</i>
DGP/29	Editorial revision for the sake of alignment with the wording of other Standards.

Moved from under 10.2.3

Note 2.— See 4.2.2 of Annex 6— Operation of Aircraft, Part I— International Commercial Air Transport— Aeroplanes for surveillance of operations by a foreign operator, Parts I, III and IV require that States recognize as valid the air operator certificate (AOC) issued by another State provided that the requirements under which the certificate was issued are at least equal to the applicable Standards specified in Annexes 6 and 19. This includes the dangerous goods training programme.

<i>Origin:</i>	<i>Rationale:</i>
DGP/29	Modified to clarify the intent of the existing note and to add missing references. It has been reported that some States subject foreign operators' training programmes to review and approval despite training programmes only being subject to the approval of the State of the Operator. A reference to the Standard in Annex 6 that specifies that the State shall recognize as valid an air operator certificate issued by another Contracting State was added through Amendment 12 to Annex 18. The expands the note by describing the actual requirement in Annex 6.

Moved to under 9.1.1 as Note 1:

~~— Note. — Dangerous goods training programmes are required for all operators regardless of whether or not they are approved to transport dangerous goods.~~

~~10.2.29.2.2~~ Dangerous goods training programmes of a State's ~~for~~ designated postal operators shall be approved by the State's civil aviation authority ~~of the State where the mail is accepted by the designated postal operator.~~

<i>Origin:</i>	<i>Rationale:</i>
DGP/29	Revised to clarify the scope of oversight. Designated postal operators may operate in different States. The wording of the current Standard may imply that the civil aviation authority must approve the training programme of foreign designated postal operators operating in its State. The existing SARP was added to Annex 18 through Amendment 12, along with new Standards in current 11.4, to control the introduction of dangerous goods not permitted in mail from entering the airmail stream. The provisions were intended to provide for stronger relationships between civil aviation and postal authorities. Not specifying the civil aviation authority as the authority required to approve the training programme could result in the designated postal operator approving itself. The civil aviation authority needs to approve the dangerous goods programme because of the unique risks to air transport of which the designated postal operator may not be aware.

~~10.2.39.2.3~~ **Recommendation.**— *Dangerous goods training programmes required for entities other than operators and designated postal operators should be approved as determined by the appropriate national authority in accordance with its safety risk management activities.*

<i>Origin:</i>	<i>Rationale:</i>
DGP/29	Modified to clarify that a risk-based approach to determining whether to approve other entities should be used. The decision will be different among States based on the level of risk posed by specific entities in the State and the size and complexity of the State. Alternate risk mitigating approaches may be more appropriate

~~— Note 1. See 11.4 for dangerous goods by mail.~~

<i>Origin:</i>	<i>Rationale:</i>
DGP/29	Deleted because provisions for the mail are no longer contained in one area and it would be inconsistent to cross reference provisions for one entity without cross referencing parts of the Annex for others.

Moved to under 9.2.1

~~— Note 2. See 4.2.2 of Annex 6 — Operation of Aircraft, Part I — International Commercial Air Transport — Aeroplanes for surveillance of operations by a foreign operator.~~

9.3 Competency of personnel

9.2.1 Each Contracting State shall require the employer to ensure their personnel are competent to perform any function for which they are responsible prior to performing any of the functions through dangerous goods training and assessment commensurate with the functions for which they are responsible.

<i>Origin:</i>	<i>Rationale:</i>
DGP/29	Moved from the Technical Instructions to make the objective of training clear.

Note.— An approach to ensuring personnel are competent to perform any function for which they are responsible is provided in Guidance on a Competency-based Approach to Dangerous Goods Training and Assessment (Doc 10147).

9.2.2 Each Contracting State shall require the employer to periodically supplement training for their personnel to take account of changes in regulations and to ensure that competency has been maintained. This shall be achieved, at a minimum, by providing recurrent training and assessment within 24 months of previous training and assessment.

<i>Origin:</i>	<i>Rationale:</i>
DGP/29	The need for recurrent training and assessment within 24 months of previous training and assessment is moved from the Technical Instruction. It is a long-standing requirement aimed at ensuring an employee's competence is maintained and that they are current with new regulations. Twenty-four months was established to reflect the fact that the regulations are modified at least once every two years through the biennial editions of the Technical Instructions. It implies that training once every two years is sufficient to ensure competency is maintained. The provision is revised to focus on the need for supplemental training to ensure competency is maintained while still maintaining the minimum requirement of recurrent training and assessment within 24 months of previous training and assessment.

9.2.3 Each Contracting State shall require the employer to ensure that instructors delivering training are competent in instruction and the function(s) that they will instruct prior to delivering such training.

<i>Origin:</i>	<i>Rationale:</i>
DGP/29	Moved from the Technical Instructions.

9.3 Training and assessment records

9.3.1 Each Contracting State shall require the employer to maintain a record of training and assessment for its personnel for a minimum period of 36 months from the most recent training and assessment completion month.

9.3.2 The record of training and assessment required by 9.3.1 shall be made available upon request to personnel or the appropriate national authority.

9.3.3 Each Contracting State shall identify the minimum information required to be included in a record of training and assessment.

<i>Origin:</i>	<i>Rationale:</i>
DGP/29	The SARPs in Section 9.3 are moved from the Technical Instructions. The record of training provides evidence that employees have been trained and assessed as competent to perform their functions. They provide a standardized tool for authorities to use when evaluating training programmes.

Moved to Chapter 9:

CHAPTER 10. — TRAINING PROGRAMMES

Moved to 9.1:

10.1 — Establishment of training programmes

~~Initial and recurrent dangerous goods training programmes shall be established and maintained in accordance with the Technical Instructions.~~

Moved to 9.2:

10.2 — Approval of training programmes

~~10.2.1 Dangerous goods training programmes for operators shall be approved by the appropriate authority of the State of the Operator.~~

Moved to under 9.1.1:

~~Note. Dangerous goods training programmes are required for all operators regardless of whether or not they are approved to transport dangerous goods.~~

Moved to 9.2.2:

~~10.2.2 Dangerous goods training programmes for designated postal operators shall be approved by the civil aviation authority of the State where the mail is accepted by the designated postal operator.~~

Moved to 9.2.3:

~~10.2.3 **Recommendation.** Dangerous goods training programmes required for entities other than operators and designated postal operators should be approved as determined by the appropriate national authority.~~

~~Note 1. See 11.4 for dangerous goods by mail.~~

Moved to under 9.2.1:

~~Note 2. See 4.2.2 of Annex 6 — Operation of Aircraft, Part I — International Commercial Air Transport — Aeroplanes for surveillance of operations by a foreign operator.~~

<i>Origin:</i>	<i>Rationale:</i>
DGP/29	This rationale applies to all of Chapter 10. Chapter 10 replaces reporting and investigation provisions currently contained in Chapter 12. It expands upon the safety data and safety information collection, analysis, protection, sharing and exchange SARPs contained in Chapter 5 of Annex 19 to apply specifically to dangerous goods.

CHAPTER 10. DANGEROUS GOODS SAFETY INTELLIGENCE

Note.— In addition to the provisions of this chapter, other provisions relative to the promotion of dangerous goods accident and incident prevention by collection and analysis of safety data and by a prompt exchange of safety information, as part of the State safety programme (SSP), are included in Annex 19 — Safety Management and, to this effect, are applicable to this Annex. Further guidance is contained in the Safety Management Manual (SMM) (Doc 9859).

10.1 Safety data collection and processing systems

The State shall ensure its safety data collection and processing systems (SDCPS) capture, store, aggregate and enable the analysis of dangerous goods safety data and dangerous goods safety information in accordance with Annex 19, 5.1.

Note 1.— Within the context of this Annex, SDCPS refers to processing and reporting systems, safety databases, schemes for exchange of information, and recorded information including but not limited to:

- a) data and information related to safety investigations by State authorities, operators or other entities involved with the transport of dangerous goods by air;*
- b) mandatory safety reporting systems as indicated in 5.1.2 of Annex 19 and 8.1.1 of this Annex; and*
- c) voluntary safety reporting systems as indicated in 5.1.3 of Annex 19 and 8.1.2 of this Annex.*

Note 2.— Guidance related to SDCPS is contained in the Safety Management Manual (SMM) (Doc 9859) and the [DG guidance material].

10.1.1 Mandatory safety reporting system

10.1.1.1 States shall include reporting of dangerous goods accidents, dangerous goods incidents and occasions when undeclared or misdeclared dangerous goods are discovered as part of their mandatory safety reporting systems in accordance with the provisions of Annex 19.

10.1.1.2 States' mandatory reporting systems shall include a requirement for the operator to report dangerous goods accidents and dangerous goods incidents to the appropriate authority of the State in which they occurred and to the State of the Operator.

10.1.1.3 States' mandatory reporting systems shall include a requirement for the operator to report occasions when undeclared or misdeclared dangerous goods are discovered in cargo or mail to the appropriate authority of the State in which they were discovered and the State of the Operator.

10.1.1.4 States' mandatory reporting systems shall include a requirement for the operator to report occasions when dangerous goods not permitted to be carried by passengers or crew are discovered by the operator, or the operator is advised by the entity that discovers the dangerous goods, either in the baggage or on the person, of passengers or crew members to the appropriate authority of the State in which this occurred.

Note.— Dangerous goods permitted to be carried by passengers and crew are provided in Part 8 of the Technical Instructions.

10.1.1.5 States' mandatory reporting systems shall include a requirement for entities other than operators to report dangerous goods accidents and dangerous goods incidents to the appropriate authority of the State in which they occurred.

10.1.1.6 **Recommendation.**— States' mandatory reporting systems should include a requirement for entities other than operators to report occasions when undeclared or misdeclared dangerous goods are discovered to the appropriate authority of the State in which they were discovered.

10.1.2 Voluntary safety reporting system

10.1.2.1 States shall establish a voluntary dangerous goods safety reporting system to collect safety data and safety information from operators that is not captured by mandatory safety reporting systems in accordance with Annex 19, 5.1.

10.1.2.2 **Recommendation.**— States should establish a voluntary dangerous goods safety reporting system to collect safety data and safety information from entities other than operators, not captured by mandatory reporting systems in accordance with Annex 19, 5.1.

10.2 Safety data and safety information analysis

States shall establish and maintain a process to analyse the dangerous goods safety data and dangerous goods safety information from the SDCPS and associated safety databases in accordance with Annex 19, 5.2.

10.3 Safety data and safety information protection

10.3.1 States shall accord protection to dangerous goods safety data captured by, and dangerous goods safety information derived from, voluntary safety reporting systems and related sources in accordance with Annex 19, 5.3.

10.3.2 **Recommendation.**— States should extend the protection referred to in 10.3.1 to safety data captured by, and safety information derived from, mandatory dangerous goods safety reporting system and related sources in accordance with Annex 19, 5.3.

10.4 Safety information sharing and exchange

10.4.1 The State shall share and exchange dangerous goods safety information in accordance with Annex 19, 5.4.

10.4.2 If a State, in the analysis of the dangerous goods information contained in its safety data collection and processing system (SDCPS), identifies safety issues which may pose an unacceptable risk to the global aviation safety system, that State shall forward such safety information to ICAO with a minimum of delay.

Note 1.— Provisions for a SDCPS and safety information sharing and exchange between States are included in Annex 19. Further guidance is contained in the Safety Management Manual (SMM) (Doc 9859).

Note 2.— Whenever practicable, the safety information sent to ICAO is to be prepared in one of the working languages of the Organization.

10.4.3 States shall provide ICAO with dangerous goods information from their SDCPS upon request to address global safety issues related to the transport of dangerous goods.

10.4.4 States shall participate in cooperative efforts with other States with the aim of eliminating unsafe practices and non-compliance with the Technical Instructions.

10.4.5 States' cooperative efforts shall include coordination of investigations of dangerous goods accidents and dangerous goods incidents, identified safety issues related to the transport of dangerous goods, non-compliance with the Technical Instructions and enforcement actions.

CHAPTER 11. COMPLIANCE

Moved to

11.1— Inspection systems

~~Each Contracting State shall establish inspection, surveillance and enforcement procedures for all entities performing any function prescribed in its regulations for air transport of dangerous goods with a view to achieving compliance with those regulations.~~

~~— Note 1. — It is envisaged that these procedures would include provisions for:~~

~~— inspecting dangerous goods consignments prepared, offered, accepted or transported by the entities referred to in 11.1;~~

~~— inspecting the practices of the entities referred to in 11.1; and~~

~~— investigating alleged violations (see 11.3).~~

~~— Note 2. — Guidance on dangerous goods inspections and enforcement may be found in the Supplement to the Technical Instructions (Part S 5, Chapter 1 and Part S 7, Chapters 5 and 6).~~

11.2— Cooperation between States

Moved to 3.2.3.2:

~~— **Recommendation.** — Each Contracting State should participate in cooperative efforts with other States concerning violations of dangerous goods regulations, with the aim of eliminating such violations. Cooperative efforts could include coordination of investigations and enforcement actions; exchanging information on a regulated party's compliance history; joint inspections and other technical liaisons, exchange of technical staff, and joint meetings and conferences. Appropriate information that could be exchanged include safety alerts, bulletins or dangerous goods advisories; proposed and completed regulatory actions; incident reports; documentary and other evidence developed in the investigation of incidents; proposed and final enforcement actions; and educational/outreach materials suitable for public dissemination.~~

11.3— Penalties

~~— 11.3.1 — Each Contracting State shall take such measures as it may deem appropriate to achieve compliance with its dangerous goods regulations including the prescription of appropriate penalties for violations.~~

~~— 11.3.2 **Recommendation.** — Each Contracting State should take appropriate action to achieve compliance with its dangerous goods regulations, including the prescription of appropriate penalties for violations, when information about a violation is received from another Contracting State, such as when a consignment of dangerous goods is found~~

~~not to comply with the requirements of the Technical Instructions on arrival in a Contracting State and that State reports the matter to the State of Origin.~~

<i>Origin:</i>	<i>Rationale:</i>
DGP/29	

Moved to Chapter 7:

11.4—Dangerous goods by mail

~~The procedures of designated postal operators for controlling the introduction of dangerous goods in mail into air transport shall be approved by the civil aviation authority of the State where the mail is accepted.~~

~~— Note 1. — In accordance with the Universal Postal Union (UPU) Convention, dangerous goods are not permitted in mail, except as provided for in the Technical Instructions.~~

~~— Note 2. — The Universal Postal Union has established procedures to control the introduction of dangerous goods into air transport through the postal services (see the UPU Parcel Post Regulations and Letter Post Regulations).~~

~~— Note 3. — Guidance for approving the procedures established by designated postal operators to control the introduction of dangerous goods into air transport may be found in the Supplement to the Technical Instructions (Part S-1, Chapter 3).~~

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~~CHAPTER 12. DANGEROUS GOODS ACCIDENT AND INCIDENT REPORTING~~

Moved partly to 3.2.3 and partly to 10.1.1.2:

~~12.1 With the aim of preventing the recurrence of dangerous goods accidents and incidents, each Contracting State shall establish procedures for investigating and compiling information concerning such accidents and incidents which occur in its territory and which involve the transport of dangerous goods originating in or destined for another State. Reports on such accidents and incidents shall be made in accordance with the detailed provisions of the Technical Instructions.~~

~~— 12.2 **Recommendation.** — With the aim of preventing the recurrence of dangerous goods accidents and incidents, each Contracting State should establish procedures for investigating and compiling information concerning such accidents and incidents which occur in its territory other than those described in 12.1. Reports on such accidents and incidents should be made in accordance with the detailed provisions of the Technical Instructions.~~

~~— 12.3 With the aim of preventing the recurrence of instances of undeclared or misdeclared dangerous goods in cargo, each Contracting State shall establish procedures for investigating and compiling information concerning such occurrences which occur in its territory and which involve the transport of dangerous goods originating in or destined for another State. Reports on such instances shall be made in accordance with the detailed provisions of the Technical Instructions.~~

~~— 12.4 **Recommendation.** — With the aim of preventing the recurrence of instances of undeclared or misdeclared dangerous goods in cargo, each Contracting State should establish procedures for investigating and compiling information concerning such occurrences which occur in its territory other than those described in 12.3. Reports on such instances should be made in accordance with the detailed provisions of the Technical Instructions.~~

CHAPTER ~~13~~ 11. DANGEROUS GOODS SECURITY PROVISIONS

11.1 Each Contracting State shall establish dangerous goods security measures, applicable ~~to shippers, operators and other individuals~~ entities in the supply chain engaged in the transport of dangerous goods by air, to be taken to minimize theft or misuse of dangerous goods that may endanger persons, property or the environment. These measures should be commensurate with security provisions specified in other Annexes and the Technical Instructions.

11.2 Each Contracting State shall establish measures to ensure the physical and cyber security of data it collects when processing exemptions for the transport of high consequence dangerous goods.

11.3 Each Contracting State shall adopt regulations to require that training and assessment in accordance with Chapter 9 are provided to security personnel who are involved with the screening of passengers and crew and their baggage and cargo or mail.

<i>Origin:</i>	<i>Rationale:</i>
DGP/29	The existing Standard is modified to include physical and cyber security of data provisions with respect to the processing of exemptions for the transport of high consequence dangerous goods and a requirement for security personnel to receive dangerous goods training. The final defence for the detection of undeclared dangerous goods is usually through security screening. This cannot be done unless security personnel are trained to recognize dangerous goods and to take measures to prevent them from being loaded on an aircraft.

议程项目 6： 支持遥控驾驶航空器系统运行的危险物品规定（编号：工作卡 DGP.007.01）**6.1 危险物品专家组遥控驾驶航空器系统（RPAS）工作组工作的最新情况**

6.1.1 危险物品专家组遥控驾驶航空器系统（RPAS）工作组（DGP-WG/RPAS）报告员提供了工作进展的最新情况。该工作组侧重于所拟定的对附件 18 的修订意见，以便明确国家在危险物品安全航空运输方面的责任（见议程项目 5 的报告）。其结论是，无需为支持遥控驾驶航空器系统专家组而对附件 18 进行重大修订。通过附件 8—《航空器适航性》和拟议的新的附件 6—《航空器的运行》第 IV 部分—国际运行—遥控驾驶航空器系统，已经确定了运行范围。该工作组建议扩大对机长的提及，以便纳入遥控机长，并建议将附件 6 第 IV 部分拟载入的遥控机长的定义纳入附件 18。

6.1.2 该工作组已开始关于《技术细则》的工作，但由于存在优先事项方面的冲突，包括对附件 18 的全面修订需要大量时间，因此未能完成这一工作。该工作组将在下一个两年期内将注意力集中在《技术细则》上。工作组已经在适航专家的帮助下审查了附件 8 所载的货舱和消防系统的现有要求。该工作组认为，理解这些要求是确保专家组的假设有效的关键第一步。工作组接下来将审查《技术细则》的每个相关部分，以查明现有要求与遥控驾驶航空器系统运行之间的差距。修订建议将提交给危险物品专家组 2024 年工作组会议。

议程项目 7： 审查对危险物品有影响的附件 6 规定（REC-A-DGS-2025）**7.1 对危险物品有影响的附件 6 规定的拟议修订（DGP/29-WP/7 号文件）**

7.1.1 危险物品专家组附件 18 工作组（DGP-WG/附件 18）查明了附件 6 —《航空器的运行》与《危险物品安全航空运输技术细则》（Doc 9284 号文件）所载危险物品规定之间存在的¹不一致之处。附件 6 的规定包含在第 I 部分 — 国际商业航空运输 — 飞机第 14 章和第 III 部分 — 国际运行 — 直升机第 12 章中。它们也被纳入了拟议的新的第 IV 部分 — 国际运行 — 遥控驾驶航空器系统的第 14 章当中。制定这些规定的目的是为了明确所有运营人都需要遵守危险物品规章，无论其是否持有运输危险物品货物的特定批准。这些规定对《技术细则》中各类运营人的责任进行了区分。所查明的一致之处主要是由于自从附件 6 规定通过以来没有对该附件进行过更新，以反映《技术细则》所载规定的变化。

7.1.2 根据议程项目 4 制定的对附件 18 的修订（见本报告第 4.1 段），包括从《技术细则》中摘录的比现有附件 18 更详细的运营人责任。建议通过与飞行运行专家组（FLTOPSP）协调，简化附件 6 中的规定，用对附件 18 拟议修订中适用规定的参引来取代详细的危险物品责任。附件 6 中将保留获得和未获得运输危险物品货物特定批准的运营人之间的区分，仅删除与附件 18 和《技术细则》重复的²详细规定。这样，附件 6 中仍可³实现明确所有运营人均须遵守危险物品规章的最初目标。删除附件 6 中的详细规定将消除冗余，并减少附件 6、附件 18 和《技术细则》所载危险物品规定之间出现其他不一致之处的风险。

7.1.3 危险物品专家组附件 18 工作组将在下一个两年期内，通过与飞行运行专家组协调制定对附件 6 的拟议修订。

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议程项目 8： 航空安保/危险物品的协调 (REC-A-DGS-2025)

8.1 航空安保专家组 (AVSECP) 没有提供最新情况。

议程项目 9： 与其他专家组的协调**9.1： 飞行运行专家组（FLTOSP）****9.1 对飞行中客舱内危险物品征候客舱机组程序的修订（DGP/29-WP/9 号文件）**

9.1.1 请会议审议了《与危险物品有关的航空器事故征候应急响应指南》（Doc 9481 号文件）第 3.3 节和第 3.4 节所载对飞行中客舱内危险物品征候客舱机组程序的修订。这些修订是根据国际民航组织客舱安全组（ICSG）的咨询建议和专业起草的。国际民航组织客舱安全组由来自各国、航空公司、经批准的培训机构、航空器制造商和国际组织的代表组成。其中包括来自 50 个提名机构的代表，其中 16 个机构提名了危险物品专家组的成员。该小组的专业知识包括客舱程序设计、客舱机组培训、工程、危险物品、事故调查、人的因素以及飞行运行。国际民航组织客舱安全组与危险物品专家组的协作由来已久。

9.1.2 国际民航组织客舱安全组秘书向会议介绍了修订内容。他指出，修订包括新的危险物品征候指南，涉及需要客舱机组介入的驾驶舱便携式电子装置（PED）起火或冒烟事件，以及航空器机上携带的灭火装备的使用指南。其中还包括对现有指南的修改，并虑及自 Doc 9481 号文件 2015-2016 年版对程序进行上一次重大更新以来获得的经验和最佳做法。纳入 2025-2026 年版的拟议修订包括：

- a) 通过仅在第 3.4 节的扩展列表中纳入客舱机组需要采取的行动及其细节，简化第 3.3 节中的列表；
- b) 对运营人的新建议，以确保航空器配备适当的消防和防护设备供机组成员使用；
- c) 经修改的指南，以确定在发生热失控事件后移动便携式电子装置的安全时间；
- d) 对于单客舱机组人员运行的新的指南；
- e) 针对客舱行李架消防程序的经修改的指南；
- f) 经修改的措辞，以使客舱机组清楚明确地了解需要采取的行动，包括将“电动调节座椅中不慎被压碎或损坏的便携式电子装置”的标题改为“落入/卡在旅客座椅中的便携式电子装置”；
- g) 当航空器上携带了灭火设备时，在电池/便携式电子装置起火或冒烟的情况下应遵循的新程序。

9.1.3 会议对国际民航组织客舱安全组所做的改进表示了赞赏。在原则上同意该修订的同时，提出了一些意见和进一步的修改建议。在这一议程项目的报告附录中对此进行了阐述。专家组的相关成员将通过信函往来与客舱安全组秘书合作，以制定任何认为必要的修改。这些修改将通过信函发送给专家组。

9.1.4 建议

9.1.4.1 根据上述讨论，会议拟定了以下建议：

建议 9/1 — 对《与危险物品有关的航空器事故征候应急响应指南》（Doc 9481 号文件）中机组人员程序的修订

将报告附录 C 中提出的对机组人员程序的拟议修订纳入《与危险物品有关的航空器事故征候应急响应指南》（Doc 9481 号文件），但需针对报告附录中就议程项目 9 提出的问题稍作修改。

9.2 关于使用电子数据向机长通报信息的规定（DGP/29-WP/25 号文件）和关于使用电子数据向机长通报信息的规定（DGP/29-IP/7 号文件和增编）

9.2.1 请会议审议了一项经修改的修订，允许使用电子数据代替根据《技术细则》第 7 部分 4.1.1 规定的书写或打印形式的信息向机长通报信息。从 2016 年召开的工作组会议（DGP-WG/16 会议，2016 年 10 月 17 日至 21 日，蒙特利尔）（见 DGP-WG/16 会议报告 3.2.7.1 段）开始，到最近的 2023 年工作组会议（DGP-WG/23 会议，2023 年 5 月 15 日至 19 日，巴西里约热内卢）（见 DGP-WG/23 会议报告 4.9.1.1 段），专家组历时数年审议了各项提案。以电子方式通报信息一直都得到了支持，许多人认为现行规定并不排除电子传输。但是，航空公司驾驶员协会国际联合会（IFALPA）提名的成员只在电子信息不是唯一信息来源的情况下才能支持允许使用电子信息，因为取消纸质副本可能会减少紧急情况下飞行机组对关键信息的可获得性，并且可能会妨碍向救援和消防部门可靠地传输信息。该成员向会议提供了此前的讨论摘要，其中强调了航空公司驾驶员协会国际联合会认为尚未解决的问题。这些情况载于 DGP/29 会议的一份信息文件当中。

9.2.2 经修改的修订允许通过电子数据处理（EDP）或电子数据交换（EDI）向机长通报信息，前提是与运营人所属国的主管当局达成了协议。提案人注意到过去提出的关切，即对电子数据处理或电子数据交换的提法限制性太强，但认为这些术语的提法是通用的，与托运人以电子方式传输危险物品运输信息时使用的术语是一致的。同时，他还表示反对过去提出的在运行手册或其他相关手册中纳入信息要求的建议，因为第 7 部分第 2 章中关于向员工提供信息的一般要求已经对此作出了规定。

9.2.3 大多数人希望推进该修订，但航空公司驾驶员协会国际联合会提名的成员尚无法支持该修订。他表示承认电子信息可以增强安全性，但仍然担心除非将这些增强手段纳入要求，否则安全性会降低。他向专家组提供了航空公司驾驶员协会国际联合会公布的一份立场文件，其中支持向提供电子信息的方向演变，但前提是满足某些标准。这些标准包括需要改进危险物品信息的功能性和可用性，更完整地描述机上所载的危险物品，并以达到或超过提供书写或打印信息的有效性的方式向救援和消防部门发送危险物品信息。此外，一个由相关利害攸关方组成的外部小组（包括航空公司驾驶员协会国际联合会、国际航空运输协会（IATA）、航空器救援和消防工作组以及全球快递协会（GEA）的专家），尚有待完成关于应急响应信息需求的研究。危险物品专家组在其第二十八次会议（DGP/28，虚拟会议，2021 年 11 月 15 日至 19 日）上决定待该小组得出结果后，再对规定进行任何修改。

9.2.4 飞行运行专家组（FLTOPSP）秘书指出，拟议修订规定了可以电子方式提供信息，以替代书写或打印信息。这与附件 6 产生了冲突，因为附件 6 要求向机长通报关于作为货物运输的危险物品的准确、清晰的书写或打印信息。他报告指出，飞行运行专家组非常支持转向电子信息，并启动了一个重要项目，以允许在航空器上携带电子文件和证书，无论其在何处被引用。可以通过这项工作，制定向机长提供电子通知的规定，这些规定应至少与现有规定一样有效和安全，并为所有利害攸关方所接受。

9.2.5 专家组得出结论认为，由于与附件 6 相冲突，并且由于作为该项规定主要利害攸关方的驾驶员无法支持该规定，因此专家组无法推进拟议的修订。一些成员坚持认为，现有规定中使用的术语允许进行电子传输，但如果所起草的修订获得通过就不能进行如此表述，因为这将与附件 6 产生冲突。专家组将在下一个两年期内努力找到一个整体解决办法。

9.3 客机定义的不当应用（DGP/29-IP/5 号文件）

9.3.1 向会议提供了适航性和运行专家对 DGP-WG/23 会议审议的附件 18 和《技术细则》所载客机定义修订的反馈。修订的目的是为了处理国际上在确定谁可以乘坐运载“仅限货机运输”危险物品的货机时与该定义的应用方式不一致的问题。危险物品专家组第二十七次会议（DGP/27，2019 年 9 月 16 日至 20 日，蒙特利尔）首次建议对定义进行修订以处理不一致的问题，但飞行运行专家反对通过附件 18 的定义来确定谁可以乘坐此类航空器，因为这是附件 6 项下的运行问题（见 DGP/27 会议报告第 8.1.1 段）。空中航行委员会没有支持该修订，因为它不认为修改客机定义的理由与其支持的附件 18 的规定相关。其结论是，区分客机与货机的运行影响，应在附件 6 —《航空器的运行》范畴内加以处理。空中航行委员会要求秘书处拟定一个短期解决办法，以处理对定义的不准确解释和使用问题，并责成飞行运行专家组安全运载物品特定工作组（FLTOPSP-SCG-SWG）处理这一更广泛的问题。秘书处随后拟定了指南，并公布在国际民航组织的公共网站上（<https://www.icao.int/safety/OPS/OPS-Normal/Pages/Personsonboard.aspx>）。但是，专家组成员并不认为该指南是一种解决办法。这一问题尚未列入飞行运行专家组安全运载物品特定工作组的工作方案，因此问题仍未得到解决。

9.3.2 在 DGP-WG/23 会议上提出的修订，是在飞行运行专家组安全运载物品特定工作组没有取得任何进展的情况下做出的。该工作组支持删除附件 18 中关于客机和货机的定义，因其认为该文件中的这些定义没有必要。但是，《技术细则》中广泛引用了这些术语，以区分每种类型航空器上所允许承运的物品，因此专家组成员认为必须保留该定义。对“客机”航空器定义提出了一项修订，旨在为运营人在确定哪些人被视为旅客方面提供更大的灵活性，从而确定哪些人可以登上运输客机所禁运危险物品的货机。修订包括一项规定，即只要在国家主管当局批准的条件下，运营人可允许任何人乘机，在 DGP-WG/23 会议上，没有人强烈反对该提案的意图，但鉴于飞行运行专家反对 DGP/27 会议关于修订该定义的建议，因此会议同意由秘书获得飞行允许专家的反馈意见。

9.3.3 秘书报告指出，秘书处内的飞行运行专家支持删除附件 18 中的定义。但是，他们也建议从《技术细则》中删除这些定义，代之以在细则中纳入条款，解释运营人是否可以在机上运输“仅限货机运输”的危险物品。他们认为，危险物品的条款不应规定谁可获准乘坐货机，因为这是一个运行/适航性问题。因此，根据《技术细则》中的定义确定谁可以乘机，可能与运行/适航要求相冲突。会议注

意到，危险物品专家组第十八次会议（DGP/18，2001 年 10 月 15 日至 25 日，蒙特利尔）讨论过类似的题目，并取得了相似的结果（见 DGP/18 会议报告第 2.2.9 段）。秘书处建议专家组考虑从这两份文件中删除客机和货机的定义，并拟定标准以确定运营人何时可以在货机上装载客机禁运的货物，作为处理这一问题的替代做法。

9.3.4 拟定了各种修订，并最终形成了一项修订，即删除两项定义，并在《技术细则》第 7 部分的 2.4.1 的货机装载规定中增加了一项规定，解释了在什么情况下，带有“仅限货机运输”标签的危险物品包装件或合成包装件可以装到除规定机组成员以外人员乘坐的货机上。这些人员需要根据运营人所属国规定的条件获得运营人的批准。这些条件需要包括附件 6 第 I 部分第 4 章对机上有旅客时的要求。拟议修订提交的时间太迟，使专家组无法对其进行全面审议，但专家组成员表示支持所采取的做法，尽管未采取精确的措辞。经修改的修订将在下一个两年期内拟定，供 2025 年秋季举行的专家组第三十次会议（DGP/30）审议，以便纳入《技术细则》2027 年至 2028 年版。专家组已同意删除议程项目 5 下的附件 18 的定义（见本报告第 5.1 段）。

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**APPENDIX TO THE REPORT ON AGENDA ITEM 9
(English only)**

**COMMENTS ON PROPOSED AMENDMENTS TO CABIN CREW
PROCEDURES FOR DANGEROUS GOODS INCIDENTS IN THE
*EMERGENCY RESPONSE GUIDANCE FOR AIRCRAFT INCIDENTS
INVOLVING DANGEROUS GOODS (DOC 9481)***

The following comments were raised during discussions on the proposed amendment to cabin crew procedures for dangerous goods incidents in the passenger cabin during flight (see paragraph 9.1 of the report on this agenda item Appendix C to the report).

1. There were two lists for each procedure in Section 3: a simplified list, which was proposed to be further simplified to contain only the action needed by the cabin crew, and an amplified list. It was suggested that future consideration be given to improving the structure of Section 3 so that it was easier to navigate between the two lists.
2. A new note was added under Section 3.3 referring to single cabin crew member operations, the need for actions listed in the procedures to be carried out with the assistance of other persons, and for the cabin crew to delegate to them the task of communicating with the flight crew while the cabin crew fought the fire. An observer noted that this was not common in her region and questioned whether it was a common practice globally. It was further suggested that guidance be provided for operations with no cabin crew onboard.
3. It was suggested that new procedures for a fire or smoke event from a battery/portable electronic device when fire containment equipment was carried on board the aircraft would apply to any fire onboard the aircraft and would therefore be more appropriately located under “General Considerations” in Section 2 of Doc 9481.
4. A recommendation for fire containment equipment, when carried on board the aircraft, to be placed on the flight deck and in the cabin was considered too prescriptive. The need and location of the equipment should be a decision of the operator based on a safety risk assessment.
5. Concerns were expressed with respect to recommending that detailed procedures for using fire containment devices be developed based on original equipment manufacturer instructions. There were many different types of devices on the market, and there was evidence that some did not perform as advertised. Research was on-going in some States and organizations to ensure they did not create unintended consequences. There was a concern that the new provisions could be interpreted as an implied recommendation for using them. Some State authorities were recommending against using the devices unless the event was over, which would contradict the original equipment manufacturer instructions.
6. References to “toilet” were considered ambiguous because “toilet” could be interpreted to mean either the actual toilet bowl or the room where the toilet bowl was located. It was suggested to replace the word with “lavatory” unless the intent was the toilet bowl.
7. It was suggested to add “fire containment equipment” as an example of a suitable empty container for submerging a portable electronic device to prevent further thermal runaway.

8. The procedures for a portable electronic device fire / smoke in an overhead bin referred to the potential for the device to be in baggage in the initial steps for cooling the device but not in the succeeding steps. It was suggested that removing the PED from the baggage should be added as a step.
9. A recommendation for Halon, Halon replacement or water to be used to extinguish the fire and prevent its spread to additional flammable materials was removed from the procedures for battery/portable electronic device fire /smoke. The reason for removing it was questioned.
10. The new guidance for dangerous goods incidents involving fire or smoke events from a portable electronic device (PED) on the flight deck that required the intervention of cabin crew listed retrieving and using protective equipment as a first step after receiving a call from the flight deck for assistance. The member nominated by the International Federation of Air Line Pilots' Associations (IFALPA) noted that maintaining control of the aircraft was the overriding responsibility of the flight crew, which might necessitate other actions by the cabin crew as a first step. He suggested adding "complying with directions from the cockpit" as a step.
11. The procedures for a PED fallen into /trapped in a passenger seat included applying procedures for battery / PED fire / smoke if smoke or flames appeared. There was concern that not having this as an earlier step might cause a delay in dealing with the smoke or flame, and this was the most critical step. It was suggested to include a cross-reference to this procedure early in the procedures to minimize the length of time the cabin crew might deal with the wrong procedure.
12. Halon was effective at suppressing a fire, but not at eliminating the generation of smoke from thermal runaway. A device needed to be cooled to stop thermal runaway for it to stop smoking. There was a concern that the firefighting procedure for a PED fire / smoke implied that cabin crew should keep applying Halon on a PED until the smoke stopped.
13. It was suggested that text be added to specify that cabin crew procedures for a battery/portable electronic device fire / smoke on the flight deck did not apply to electronic flight bags or electronic devices that were part of the aircraft equipment.

Note.— Development of guidance for flight crew to deal with incidents involving electronic flight bags, PEDs and power banks in the cockpit had been assigned to the FLTOSP Specific Working Group on the Safe Carriage of Goods. The location of the guidance was to be determined.

14. Notifying the pilot-in-command was included as one of the actions in the procedures for an incident involving a PED fallen into or trapped in a passenger seat, but not for any of the other procedures. Why it was included here but nowhere else was questioned.
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议程项目 10： 《危险物品专家组（DGP）帮助编制技术细则和辅助文件的指导材料》与经修改的危险物品规定的协调统一

10.1 危险物品专家组指导材料的拟议修改版本（DGP/29-WP/28 号文件）（仅有英文）

10.1.1 专家组通过了新版《危险物品专家组（DGP）帮助编制技术细则和辅助文件的指导材料》（第 2 版）。该文件载有帮助专家组成员保持《技术细则》及其辅助文件的指导材料。它包含了制定危险物品文件时使用的一般原则，以及决定如何对其进行修改的指导。同时还提供了一个机制来记录专家组所作决定的理由，包括那些导致偏离《联合国规章范本》的决定。该指导材料旨在为专家组的长期成员和新成员提供有用的资源。该文件需要进行大量审查，因为自 1999 年首次编制以来，该文件一直没有进行过更新。

10.1.2 危险物品专家组与联合国协调统一工作组的任务是维护该指南，并在过去两个两年期内一直致力于这项工作。工作组更新了该文件，以处理 DGP/28 会议上提出的一项关切，即关于放射性物质的存放位置与人之间距离的指导可能无法确保对飞行机组的必要保护水平（见 DGP/28 会议报告第 7.1 段），并反映 DGP-WG/23 会议上作出的决定（见 DGP-WG/23 会议报告第 4.10 段）。

10.1.3 会议对所完成的工作表示了高度赞赏。这对所有成员，尤其对新成员而言是一种宝贵的资源。会议强调了确保该文件今后保持与时俱进的重要性，并提出了这样做的各种方法。会议商定，如工作组职权范围所述，危险物品专家组与联合国协调统一工作组是负责对该文件进行更新的机构。同时还将考虑请工作文件提交人分析其提案可能对指导文件产生的影响。而后，危险物品专家组与联合国协调统一工作组可在其对指南的两年一次更新中审议这些分析。关于补篇的危险物品工作组为拟议修订制定了一份工作文件模板，其中包括一个常设段落，说明了如果专家组接受所提交的提案将需要对其他文件进行的相应修订。秘书将在危险物品专家组公共网站上公布该模板和指导文件。危险物品专家组与联合国协调统一工作组将审议专家组提出的拟议程序，并将其纳入指导文件。会议对这些程序的必要性表示支持，同时也认识到了如果程序被证明无效则需要对其进行修改的灵活性。

10.1.4 有人提议对一项陈述作出更正，涉及仅允许旅客和机组成员携带第 8 部分表格中所列的危险物品。这一陈述是不准确的，因为通过一般例外或特殊规定，也允许携带其他物品。不过，专家组认为这是一个小问题，不应阻止专家组通过该文件。将在下一个两年期进行更正。

10.1.5 该文件将上传至危险物品专家组公共网站，并作为一种持续做法提供给专家组的新成员。危险物品专家组的所有会议都将保留一个关于对指南进行协调统一的议程项目，以便建立一个正式的审查机制。

议程项目 11： 其他事项**11.1 危险物品专家组（DGP）工作组会议报告（危险物品专家组工作组第二十二次会议和危险物品专家组工作组第二十三次会议）（DGP/29-WP/2 号文件和 DGP/29-WP/3 号文件）**

11.1.1 会议审查了 2022 年和 2023 年危险物品专家组工作组会议报告的叙述部分，包括 DGP-WG/22 会议（2022 年 11 月 21 日至 25 日，蒙特利尔）和 DGP-WG/23 会议（2023 年 5 月 15 日至 19 日，巴西里约热内卢）。批准了这些叙述部分，没有提出评论意见。根据以下文件对各工作组提出的修订进行了审查：

- a) DGP/29-WP/11 号文件、12 号文件（和增编）、13 号文件（和增编）、14 号文件（和增编）、15 号文件（和增编）、16 号文件、19 号文件（和增编）以及 20 号文件（见关于议程项目 1 的报告）；
- b) DGP/29-WP/18 号文件和 21 号文件（见关于议程项目 2 的报告）；和
- c) DGP/29-WP/17 号文件（见关于议程项目 3 的报告）。

11.2 国际民航组织/万国邮政联盟联络委员会的报告（DGP/29-WP/10 号文件）

11.2.1 秘书处介绍了 2023 年 6 月 28 日和 29 日在蒙特利尔召开的国际民航组织/万国邮政联盟（UPU）联络委员会第六次会议的报告。成立该委员会是为了满足万国邮联与国际民航组织的协作需求，以便根据其各自的任务就共同关心的问题协调开展工作。与危险物品最相关的题目概述如下。

11.2.2 正在努力了解为什么在万国邮联的 192 个成员国中，只有 35 个指定邮政运营人获得了其民航当局的批准，可以根据《技术细则》第 1 部分 2.3 节收运装在设备中的锂电池。会上表达的关切是，尽管大多数指定邮政运营人未获批准收运锂电池，但经常在邮件中发现锂电池。对万国邮联如何解决这一问题提出了疑问。国际民航组织/万国邮联联络委员会中的国际民航组织协调人报告指出，国际民航组织已将这一问题作为一项主要关切向万国邮联提出，两个组织正在共同努力加以改进。专家组成员亦有兴趣进一步了解有多少民航局批准了有关指定邮政运营人的一般程序，以控制在邮件中引入危险物品。

11.2.3 正在持续努力应对与境外互换所（ETOE）有关的挑战。专家组对这种做法一再表示关切。尤其令人关切的是，在联程转运期间，境外互换所将货运流程与航空货运单文件和邮件流程与信函邮递文件合并，以规避货运条例。国际航空运输协会（IATA）和万国邮联成立了一个专家组来处理这一问题，但进展缓慢。

11.2.4 会上注意到，根据议程项目 5 拟定的附件 18 中关于通过邮政运输危险物品的拟议新章节，与万国邮联秘书处进行了协调并得到其支持。对现有的标准和建议措施进行了修订，以便更清楚地概

述指定邮政运营人的责任。还增加了标准和建议措施，以处理在外国开展业务的境外互换所之类的邮政当局。令成员们感到鼓舞的是，如果理事会通过了附件 18 中的新章节，则国际民航组织普遍安全监督审计计划（USOAP）关于危险物品的规程问题可能会更加细化。

11.2.5 已要求万国邮联向专家组提供一份工作文件，但由于一场大型邮政大会，万国邮联无法这样做。万国邮联的一名代表预计将出席危险物品专家组的下次工作组会议。会上强调，国际民航组织及其他相关组织需要与万国邮联继续合作，以确保最高的安全水平。一家大型航空公司运营人的代表表示，邮件是其风险最高的商品。国际民航组织/万国邮联联络委员会中的国际民航组织协调人请各位成员、观察员和顾问向其提供进一步证明邮政当局需要采取更有力措施的任何信息，以便她提请万国邮联注意。

11.3 阿联酋危险物品培训教员（DGTI）和危险物品岗位持有人（DGPH）能力验证（COVAL）举措概述（DGP/29-IP/3 号文件和 DGP/29-IP/4 号文件）

11.3.1 向会议介绍了阿拉伯联合酋长国（UAE）能力验证方案（COVAL）的概况。此前已将其提交给国际民航组织大会第 41 届会议（2022 年 9 月 27 日至 10 月 7 日，蒙特利尔）。阿联酋向大会通报，它主动提出与国际民航组织全球航空培训科共享能力验证方案的材料，并将向国际民航组织成员国免费提供能力验证方案的每项课程的名额。大会技术委员会赞赏地肯定了阿联酋的工作，并表示同意将信息提交给危险物品专家组。请专家组考虑将能力验证方案的概念纳入指导材料，以帮助各国验证其危险物品培训教员和危险物品岗位持有人的胜任能力。

11.3.2 阿联酋在 15 年前便制定了危险物品的认证方案，以确保所有源自阿联酋的危险物品均由获得危险物品认证的实体提供航空运输，通过对危险物品培训提供者和培训教员进行认证来提高危险物品培训的质量，并通过对危险物品岗位持有人的认证来提高运行安全。使用了各种方法来验证是否合格。能力验证方案的方法采用了综合做法进行认证。所有危险物品培训教员和危险物品岗位持有人都必须在阿联酋参加能力验证方案的认证课程。已于 2023 年为危险物品培训教员提供了每月一次的能力验证方案的初始认证课程，并将从 2024 年 1 月开始为危险物品岗位持有人提供该课程。

11.3.3 会议对这一出色的方案表示祝贺，并感谢阿联酋分享材料、提议将能力验证方案的概念纳入危险物品指导材料并向成员国免费提供参加能力验证方案课程的机会。专家组其他成员报告了他们在各自国家实施基于能力培训的方法。

11.3.4 阿联酋已邀请危险物品专家组考虑将能力验证方案的概念纳入《危险物品安全航空运输技术细则补篇》（Doc 9284SU 号文件）。会上建议亦可考虑其他文件，包括正在拟定的支持实施附件 18 的新的指导文件（见关于议程项目 5 的报告）和《基于胜任能力的危险物品培训和评估做法指导》（Doc 10147 号文件）。专家组其他成员报告了在其各自国家实施基于能力培训的做法。会上建议将各国的最佳做法纳入同一文件当中。

11.4 执法机构依照监管链运输非法物质（DGP/29-IP/11 号文件）

11.4.1 会议讨论了在应对执法机构提出的在保持监管链的情况下运输非法物质的请求方面所面临的挑战，这些非法物质可能被归类为危险物品，用于进行实验室初步检测或作为起诉证据。会上支持编写指导材料，同时认识到这是一个复杂的问题，需要与其他部门协调。货运安全科科长指出，联合国毒品和犯罪问题办公室对这一题目非常感兴趣，与该办公室的合作可能非常有助益。专家组成员有兴趣在下一个两年期进一步思考这个问题。

11.5 告别

11.5.1 会议向三位尊敬的专家组成员道别，他们将结束长期而成功的职业生涯，当之无愧地退休：**D. Brennan**，国际航空运输协会（IATA）提名的专家组成员；**S. Schwartz**，航空公司驾驶员协会国际联合会（IFALPA）提名的专家组成员；**A. McCulloch**，全球快递协会（GEA）观察员，他曾担任联合王国提名的专家组成员的顾问。他们被誉为数十年来专家组骨干队伍中的杰出人士。他们的离去将留下巨大的空白。专家组感谢他们多年来慷慨分享知识、见解和专长。

11.5.2 会议还向加拿大提名的前专家组成员、2014年至2020年底担任专家组主席的**M. Paquette**女士表示敬意。由于COVID-19大流行，专家组上次会议是以虚拟形式举行的，因此未能在上次会议上向她表示敬意。**Paquette**女士开始担任主席时，正值专家组成员对锂电池持有强烈且相互冲突的观点，因此她的任期极具挑战性。她以强大的领导力、优雅的风度和敬业的精神引导专家组完成了艰难的讨论而受到称赞。

11.5.3 最后，会议向**Katherine Rooney**博士致敬，她是货运科科长，曾任专家组秘书30多年。**Rooney**博士被誉为专家组的指导力量，她以稳健的作风和坚定不移的精神带领专家组走过了不断变化的局面。专家组对她分享的知识、她帮助专家组应对的挑战以及她培养的良好团队精神表示感谢。

11.5.4 专家组庆祝四位获赞誉者为专家组带来的知识财富、奉献精神和友谊，并祝愿他们未来健康快乐，生活充满新的冒险。

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报告附录 A

根据议程项目 1、2、3 和 4 对《技术细则》的综合修订

第 1 部分

概论

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第 1 章

范围和适用

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1.1 一般适用范围

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对有关电池规定的修订

DGP/29-WP/3 号文件第 4.4.1.5 段和本报告第 1.2.1.1.1 段:

1.1.5 一般性例外

1.1.5.1 除了 7;4.2 中规定的情况外, 本细则不适用于由航空器承运的以下危险物品:

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h) 置于作为货物运送的超重行李物件之内的危险物品, 条件是:

- 1) 超重行李是由旅客本人或以其名义作为货物托运的;
- 2) 危险物品只能是按照 8;1.1.2 规定允许在交运行李中运输的危险物品;
- 3) 超重行李标有“Excess baggage consigned as cargo (超重行李作为货物托运)”的字样。

i) 装有锂电池、附着在或置于包装件、合成包装件或集装器的数据记录器和货物追踪仪, 但需满足以下条件:

- 1) 运输过程中, 数据记录器或货物追踪仪必须在用或打算使用;
- 2) 每一电池芯或电池必须满足第 2 部分 9.3 a)、e)、f) (如适用) 和 g) 中的规定;
- 3) 对于锂离子电池芯, 瓦时额定值不超过 20 Wh;
- 4) 对于锂离子电池, 瓦时额定值不超过 20 Wh;
- 5) 对于锂金属电池芯, 锂含量不超过 1 克;
- 6) 对于锂金属电池, 累计锂含量不超过 1 克;

- 7) 任何包装件或合成包装件之内或其上的数据记录器或货物追踪仪的数量不得超过跟踪或收集特定托运货物的数据所需的数量；
- 8) 数据记录器和货物追踪仪必须能够承受运输过程中通常遇到的冲击和负载；
- 9) 这些装置不得产生危险的热量释放；和
- 10) 这些装置必须满足规定的电磁辐射标准，以确保装置的运行不会干扰航空器系统。

注：如果按照包装说明 967 或 970 的规定，将数据记录器或货物追踪仪作为托运货物交由运输，则本例外不适用。

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1.3 标准的适用

在要求适用一条标准的情况下，如果该标准与本细则之间有任何冲突，本细则优先。该标准中与本细则不相冲突的要求，必须按规定予以适用，包括在该标准中作为规范加以提及的任何其他标准或某项标准某一部分所含的要求。

为与联合国协调一致的修订

DGP/29-WP/3 号文件第 4.1.2.1.2 段：

《联合国规章范本》，第 1.1 章，1.1.1.7（参见 ST/SG/AC.10/50/Add.1）

注：标准提供了如何满足本《细则》规定的细节，并可包括本《细则》规定之外的要求。

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第 3 章

一般说明

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3.1 定义

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为与联合国协调一致的修订

DGP/29-WP/3 号文件第 4.1.2.1.2 段：

《联合国规章范本》，第 1.2 章，1.2.1（参见 ST/SG/AC.10/50/Add.1）

危险物品安保 在航空器上运输危险物品的运营人、托运人和其他人采取的措施或预防措施，以尽量减少可能危及人员或财产安全的危险物品的盗窃或滥用。

充装率 指在 15°C 下装入封装工具的液体或固体体积与准备好待用的封装工具的容积之比，以%表示。

设计 对运输放射性物质而言，对根据 2;7.2.3.5.1 f) 被列为例外的易裂变材料、特殊形式的放射性物质、低弥散性放射性物质、包装件或包装所做的能使这些物品被充分识别的描述。该描述可包括规格、工程图纸、证明符合监管要求的报告及其他相关文件。

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为便于运输或国家监督的修订

本报告第 3.2 段：

独家使用 对运输放射性物质而言，系指单个托运人独自使用一架航空器或一个大型货运集装箱。其所有初始、中途和最后的装卸和运输活动均在托运人或收货人的指导下进行（如果本细则有此要求）。

注：根据 1972 年《国际集装箱安全公约》，大型货运集装箱无需获得批准。

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为与联合国协调一致的修订

DGP/29-WP/3 号文件第 4.1.2.1.2 段：

《联合国规章范本》，第 1.2 章，1.2.1（参见 ST/SG/AC.10/50/Add.1）

GHS 《全球化学品统一分类和标签制度》第九十修订版，由联合国以 ST/SG/AC.10/30/Rev.910 号文件公布。

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《试验和标准手册》即联合国出版的《试验和标准手册》第七八修订版（ST/SG/AC.10/11/Rev.78 和第 1 次修订）。

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《规章范本》题为《关于危险货物运输的建议书：规章范本》的联合国出版物第二二三修订版（ST/SG/AC.10/1/Rev.223）。

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回收塑料 是指从使用过的工业包装回收的、经洗净后准备用于加工成新包装的材料。用于生产新包装的回收材料的具体性质必须定期查明并记录，作为国家有关当局承认的质量保证方案的一部分。质量保证方案必须包括正常的预分拣和检验记录，表明每批回收塑料都有与用这种回收材料制造的设计型号一致的正常熔体流率、密度和拉伸屈服强度。这必然包括了解回收塑料来源的包装材料以及了解这些包装先前的内装物，如果这些先前的内装物可能降低用该回收材料制造的新包装的性能。此外，包装制造商质量保证方案必须包括对每批回收塑料制造的包装进行第 6 部分第 4 章中的机械设计型号试验。在这一试验中，堆码性能可通过适当的动力压缩试验而不通过静力载荷试验检验。是指从使用过的工业包装或从经过预分拣和准备的其他塑料中回收的材料，可加工成新包装，包括加工成中型散货箱。用于生产包括中型散货箱在内的新包装的回收材料，其具体特性必须得到保证和定期记录，此为国家主管部门承认的质量保证方案的一部分。质量保证方案必须包括适当的预分拣和检验记录，能表明每批回收塑料都成分均匀，与用这种回收材料制造的设计型号的材料规格（熔体流率、密度和拉伸性能）一致。这必然包括了解作为回收塑料来源的原塑料的信息，而在先前的使用可能降低用该回收材料制造的新包装（包括中型散货箱）的性能时，还必须了解这些原塑料的先前用途，包括先前内装物信息。此外，制造商对本《细则》6: 1.1.3 中规定的包装或《联合国规章范本》6.5.4.1 中规定的中型散货箱的质量保证方案必须包括对每批回收塑料制造的《细则》第 6 部分第 4 章中规定的包装或《联合国规章范本》6.5.6 中规定的中型散货箱进行机械设计型号试验。在这一试验中，堆码性能可通过适当的动力压缩试验而非静态载荷试验予以检验。

注：ISO 16103:2005 “包装 — 危险物品运输包装件 — 回收塑料”规定了批准使用回收塑料须遵循程序的补充指南。本准则是根据用再生塑料材料制造桶和罐的经验制定的，因此可能需要作出修改，以适合用再生塑料材料制成的其他类型的包装、中型散货箱和大型包装。

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集装箱（ULD） 任何类型的货运集装箱，一种用于对空运货物、邮件和行李进行分组和约束的装置。此装置可以是航空器集装箱，带网的航空器集装板或带网和棚的航空器集装板。也可以是航空器集装板与航空器集装板网的组合。集装箱的设计使其直接受到航空器货物装载系统（CLS）的约束。

注 1：本定义不包括合成包装件。

注 2: 本定义不包括用于盛装放射性物质的专用货箱 (见 2; 7.1.3)。

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第 4 章

危险物品培训

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为便于运输或国家监督的修订

DGP/29-WP/2 号报告第 4.3.5 段:

4.4 培训和评估记录

4.4.1 用人单位必须保持人员培训和评估记录。

4.4.2 培训和评估记录必须包括:

- a) 受训人员姓名;
- b) 最近一次完成培训和评估的月份;
- c) 符合培训和评估要求的培训和评估资料说明、复印件或参考资料;
- d) 说明提供培训和评估的单位名称及其他信息 (如注册地址); 和
- e) 表明人员已被评估为合格的证据。

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第 2 部分

危险物品的分类

引言章

1. 责任

1.1 当要求国家有关当局进行分类时，必须由国家有关当局分类，否则，可以由托运人进行分类。

本报告第 2.2.2 段：

1.2 如果危险物品的分类是由托运人进行的，则托运人用于指定分类的信息必须应要求提供给国家有关当局（如果在危险物品运输之日起三个月内提出要求）。

注：此类信息的例子包括：

- a) 物质的已知成分；
- b) 车辆等物品的已知物理特性；
- c) 分类测试结果和本《细则》第 2 部分中确定的其他适用要求；或
- d) 根据《全球化学品统一分类和标签制度》（GHS）发布的安全数据表。

~~1.2~~1.3 ~~发货人~~托运人如根据试验数据，发现按第 3 部分第 2 章表 3-1 危险物品表的第 1 列中的名称列出的某种物质达到该表中没有列出的危险类别或项别的分类标准，可在主管国家当局的批准下，托运该物质，条件是：

- a) 使用最适当的可反映所有危险的类属条目或“未另作规定的”（n.o.s）条目；
- b) 使用同一联合国编号和名称，但酌情添加危险通知信息（单证、标签），反映其他的次要危险性，但主要危险类别保持不变，且通常情况下对具有此种组合危险的物质适用的任何其他运输条件（如限量、包装规定）与适用于所列物质的条件相同。

~~1.2~~1.3.1 必须给托运货物附上一份批准文件的副本。

注：主管国家当局在给予这种批准时，应相应通知联合国危险物品运输问题专家小组委员会，并提出一份针对危险物品表的相关修订提议。如果修订提议未被采纳，该主管国家当局应撤回其批准。

本报告第 1.2.1.8 段：

6. 未另作规定的含有危险品的物品的分类。

6.0 不具备现有运输专用名称、并仅含作为机器或器械的残留物或组成部分的危险品的物品必须分类如下：

- a) 如果危险物品符合包装说明 962 的规定：UN 3363 — 器械中的危险物品、物品中的危险物品或机器中的危险物品；或

- b) 如果机器或器械中危险物品的净量超过包装说明 962 的限制，但含有《联合国规章范本》第 7 (a) 栏所定限量内准许的限制数量的危险品，见特殊规定 A107；或
- c) 依照本节第 6.1 至 6.6 段的规定（如适用）。

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为与联合国协调一致的修订

DGP/29-WP/3 号文件第 4.1.2.1.3 段：

《联合国规章范本》，第 2.0 章，2.0.5.2（参见 ST/SG/AC.10/50/Add.1）

6.2 这种物品也可含有电池芯或电池。属物品组成部分的锂电池芯和电池必须是经验证符合联合国《试验和标准手册》第 III 部分第 38.3 小节试验要求的类型，~~本细则另有规定者除外（例如，含有锂电池的投产前原型物品，或一次小批量生产的此种物品，批量不超过 100 件）~~。对于为试验而运输的含有预生产原型锂电池芯或电池的物品，或对于在不超过 100 个电池芯或电池的生产批量中制造的含有锂电池芯或电池的物品，应适用特殊规定 A88 的要求。

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第 1 章

第 1 类 — 爆炸品

为与联合国协调一致的修订

DGP/29-WP/3 号文件第 4.1.2.1.3 段：

《联合国规章范本》，第 2.1 章，2.1.1.3（参见 ST/SG/AC.10/50/Add.1）

1.2 定义

在本细则中，适用下述定义：

- a) **爆炸性物质**是固态或液态物质（或物质混合物），自身能够通过化学反应产生气体，其温度、压力和速度高到能对周围造成破坏。烟火物质即使不放出气体也包括在内；
- b) **烟火物质**是用来产生热、光、声、气或烟的效果或这些效果加在一起的一种**物质或物质混合物**爆炸性物质。这些效果是由不起爆的自持放热化学反应产生的；
- c) **爆炸性物品**是含有一种或几种爆炸性物质的物品。
- d) **减敏的**，是将一种物质（或减敏剂）加入爆炸物中，以增加搬运和运输过程中的安全。减敏剂使爆炸物不敏感或降低爆炸物对以下情况的敏感度：热、振动、撞击、打击或摩擦。典型的减敏剂有纸、蜡、水、聚合物（如氯氟聚合物），酒精和油等（如凡士林油和石蜡），但并不限于此列。

- e) 爆炸或烟火效果在涉及 1.1 c) 时，是指自我维持的放热化学反应产生的效果，包括冲击、爆炸、碎裂、投射、热、光、声、气体和烟。

注：有些与爆炸性相关的其他术语解释见本细则附录 2。

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第 3 章

第 3 类 — 易燃液体

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为与联合国协调一致的修订

DGP/29-WP/3 号文件第 4.1.2.1.3 段：

《联合国规章范本》，第 2.3 章，2.3.1.4（参见 ST/SG/AC.10/50/Add.1）

3.1.4 减敏的液态爆炸品是指溶解于或悬浮于水或其他液体物质，形成一种均匀液体混合物，以抑制其爆炸性的爆炸性物质（见 1.5.2.3）。危险物品表（表 3-1）中用于减敏的液态爆炸品条目为：UN 1204，UN 2059，UN 3064，UN 3343，UN 3357-，~~和~~UN 3379 和 UN 3555。

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第 4 章

第 4 类 — 易燃固体； 易于自燃的物质；遇水放出易燃气体的物质

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4.2 易燃固体、自反应物质、减敏爆炸品和聚合物质

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4.2.2 4.1 项 — 易燃固体

4.2.2.1 定义和性质

4.2.2.1.1 易燃固体是易于燃烧的固体和摩擦可能起火的固体。

4.2.2.1.2 易于燃烧的固体为粉状、颗粒状或糊状物质，这些物质如与燃烧着的火柴等火源短暂接触即能容易地起火，并且火焰会迅速蔓延，就十分危险。危险不仅来自于火，还可能来自毒性燃烧产物。金属粉特别危险，一旦着火就难以扑灭，因为常用的灭火剂如二氧化碳或水只能增加危险性。

为与联合国协调一致的修订

DGP/29-WP/3 号文件第 4.1.2.1.3 段：

《联合国规章范本》，第 2.4 章，2.4.2.2.1（参见 ST/SG/AC.10/50/Add.1）

4.2.2.1.3 金属粉末是金属或金属合金的粉末。

4.2.2.2 易燃固体的分类

《联合国规章范本》，第 2.4 章，2.4.2.2.1（参见 ST/SG/AC.10/50/Add.1）

4.2.2.2.1 粉状、颗粒状或糊状物质如在根据联合国《试验和标准手册》第 III 部分第 33.2.1 小节所述的试验方法进行的试验中有一次或多次燃烧时间不到 45 秒或燃烧速率大于 2.2 mm/s，必须划为 4.1 项的易于燃烧固体。~~金属或金属合金粉末~~金属粉末如能点燃，并且反应在 10 分钟以内蔓延到试样的全部长度时，必须划为 4.1 项。

4.2.2.2.2 在制定明确的标准之前，摩擦可能起火的固体必须根据现有条目（如火柴）以类推方法划为 4.1 项。

《联合国规章范本》，第 2.4 章，2.4.2.2.3.1（参见 ST/SG/AC.10/50/Add.1）

4.2.2.3 包装等级的划定

4.2.2.3.1 包装等级根据 4.2.2.2.1 中提到的试验方法划定。易于燃烧的固体（金属粉除外），如燃烧时间小于 45 秒并且火焰通过湿润段，必须划入 II 级包装。~~金属或金属合金粉末~~金属粉末，如反应段在 5 分钟以内蔓延到试样的全部长度，必须划入 II 级包装。

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第 5 章

第 5 类 — 氧化性物质；有机过氧化物

表 2-7 包装中目前划定的有机过氧化物物品名表

注：拟运输的过氧化物必须符合下表所列的分类和控制温度与危急温度（根据自加速分解温度（SADT）算出）。

为与联合国协调一致的修订

DGP/29-WP/3 号文件第 4.1.2.1.3 段：

有机过氧化物	浓度 (%)	B 型		控制 温度 (°C)	危急 温度 (°C)	UN 类属 条目	次要危 险性和 备注
		A 型 稀释剂 (%)	稀释剂 (%) (注 1)				
tert-Butyl peroxybenzoate 过氧苯甲酸叔丁酯	≤52		≥48			3106	
《联合国规章范本》，列入 IBC520 并参见《联合国规章范本》2.5.3.2.4							
tert-Butyl peroxybenzoate 过氧苯甲酸叔丁酯	≤32	≥68				3109	
tert-Butyl peroxybutyl fumarate 富马酸叔丁基过氧丁基酯	≤52	≥48				3105	
.....							
Dibenzoyl peroxide 过氧化二苯甲酰	≤42 在水中稳 定弥散					3109	
《联合国规章范本》，第 2.5 章，2.5.3.2.4（参见 ST/SG/AC.10/50/Add.1）和本报告第 1.2.1.2.1 c) 段：							
Dibenzoyl peroxide 过氧化二苯甲酰	≤42	≥38		≥13		3109	
Dibenzoyl peroxide 过氧化二苯甲酰	≤35		≥65			豁免	29
Di-(4-tert-butylcyclohexyl) peroxydicarbonat 二-(4-叔丁基环己基)过氧重碳酸酯	≤100			+30	+35	3114	
.....							
Di-2,4-dichlorobenzoyl peroxide 过氧化二-2,4-二氧苯甲酰	≤77			≥23		禁运	3
Di-2,4-dichlorobenzoyl peroxide 过氧化二-2,4-二氧苯甲酰	≤52 含 硅油糊状					3106 3104	

有机过氧化物	浓度 (%)	B 型		惰性 固体 (%)	水 (%)	控制 温度 (°C)	危急 温度 (°C)	UN 类属 条目	次要危 险性和 备注
		A 型 稀释剂 (%)	稀释剂 (%) (注 1)						
Di-2,4-dichlorobenzoyl peroxide 过氧化二-2,4-二氧苯甲酰	≤52 糊状					+20	+25	3118	
.....									
2,5-Dimethyl-2,5-di-(tert-butylperoxy) hexane 2,5-二甲基-2,5-二(叔丁基过氧)己烷	≤47 糊状							3108	
2,5-Dimethyl-2,5-di-(tert-butylperoxy) hexane 2,5-二甲基-2,5-二(叔丁基过氧)己烷	≤ 22		≥ 78					豁免	29
2,5-Dimethyl-2,5-di-(tert-butylperoxy) hexane 3 2,5-二甲基-2,5-二(叔丁基过氧)3-己烷	>86~100							禁运	3
.....									
Methylcyclohexanone peroxide(s) 过氧化甲基环己酮	≤67		≥33			+35	+40	3115	
Methyl ethyl ketone peroxide(s) 过氧化甲基乙基酮	见注 33	≥ 41			≥9			3105	33 34
Methyl ethyl ketone peroxide(s) 过氧化甲基乙基酮	见注 8)	≥48						禁运	3,8,13
.....									

注:

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32. 活性氧 ≤ 4.15%。

33. 有效氧 ≤ 10%。

34. A 型稀释剂和水的总和 ≥ 55%，此外还有甲乙酮。

第 6 章

第 6 类 — 毒性物质和感染性物质

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6.3 6.2 项 — 感染性物质

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6.3.2 感染性物质的分类

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表 2-10 除非另有指明，以任何形式列入 A 类的感染性物质示例（6.3.2.2.1 (a)）

为与联合国协调一致的修订

DGP/29-WP/3 号文件第 4.1.2.1.3 段：

《联合国规章范本》，第 2.6 章，2.6.3.2.2.1（参见 ST/SG/AC.10/50/Add.1）和本报告第 1.2.1.2.1 d) 段：

联合国编号和运输专用名称	微生物
UN 2814 感染性物质，对人感染	<p>.....</p> <p>猴痘病毒（仅限培养菌种）¹</p> <p>.....</p>

¹ “Monkeypox（猴痘）”被世界卫生组织（WHO）更名（英文）为“猴痘（mpox）”（中文不适用）。

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第 7 章

第 7 类 — 放射性物质

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7.1.3 专门术语的定义

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为与联合国协调一致的修订

DGP/29-WP/3 号文件第 4.1.2.1.3 段：

《联合国规章范本》，第 2.7 章，2.7.1.3（参见 ST/SG/AC.10/50/Add.1）

放射性核素的比活度 系指该核素每单位质量的活度。某物质的比活度必须是放射性核素基本均匀分布物质的单位质量的活度。

注：“放射性浓度”和“比活度”在本细则中是同义词。

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第 9 章

第 9 类 — 杂项危险物质和物品，包括危害环境的物质

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为与联合国协调一致的修订

DGP/29-WP/3 号文件第 4.1.2.1.3 段：

《联合国规章范本》，第 2.9 章，2.9.2（参见 ST/SG/AC.10/50/Add.1）

9.2 第 9 类的划定

如表 2-16 中所示，第 9 类物质和物品可进一步细分如下。

表 2-16 第 9 类物质和物品

UN 编号	名称	说明
<i>Lithium batteries</i> 锂电池		
3090	Lithium metal batteries (including lithium alloy batteries) 锂金属电池（包括锂合金电池）	见 2.9.3
3091	Lithium metal batteries contained in equipment (including lithium alloy batteries) 装在设备中的锂金属电池（包括锂合金电池）	
3091	Lithium metal batteries packed with equipment (including lithium alloy batteries) 同设备包装在一起的锂金属电池（包括锂合金电池）	
3480	Lithium ion batteries (including lithium ion polymer batteries) 锂离子电池（包括聚合物锂离子电池）	
3481	Lithium ion batteries contained in equipment (including lithium ion polymer batteries) 装在设备中的锂离子电池（包括聚合锂离子电池）	
3481	Lithium ion batteries packed with equipment (including lithium ion polymer batteries) 同设备包装在一起的锂离子电池（包括聚合锂离子电池）	
3536	Lithium batteries installed in cargo transport unit 装在货运装置中的锂电池	

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为与联合国协调一致的修订

和

对电池规定的修订

DGP/29-WP/3 号文件第 4.1.2.1.3 段:

《联合国规章范本》，第 2.9 章，2.9.2（参见 ST/SG/AC.10/50/Add.1）

Sodium ion batteries
钠离子电池

3551	Sodium ion batteries with organic electrolyte 含有机电解质的钠离子电池	见 9.4
3552	Sodium ion batteries contained in equipment with organic electrolyte 含有机电解质的装在设备中的钠离子电池	
3552	Sodium ion batteries packed with equipment with organic electrolyte 含有机电解质的与设备包装在一起的钠离子电池	

.....

Life-saving appliances
救生设备

2990	Life-saving appliances, self-inflating 救生器材，自动膨胀式	
3072	Life-saving appliances, not self-inflating containing dangerous goods as equipment 非自动膨胀式救生器材，器材中带有危险品	
3268	Safety devices, electrically initiated 救生器材，电启动	

为与联合国协调一致的修订

DGP/29-WP/3 号文件第 4.1.2.1.3 段:

《联合国规章范本》，第 2.9 章，2.9.2（参见 ST/SG/AC.10/50/Add.1）

3559	Fire suppressant dispersing devices 灭火剂散布装置	
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Genetically modified micro-organisms (GMMOs) and genetically modified organisms (GMOs)
转基因微生物和转基因生物体

3245	Genetically modified micro-organisms 转基因微生物	不符合毒性物质（见 6.2）或感染性物质（见 6.3）定义的转基因微生物或转基因生物体，必须划为 UN 3245。
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3245	Genetically modified organisms 转基因生物体	转基因微生物或转基因生物体，如得到始发国、过境国和目的地国的国家主管当局使用批准，则不受本细则约束。以随时可施用的形式包装并含有转基因微生物或转基因生物体的医药产品(如疫苗)，包括正在进行临床试验的医药产品，不受本细则限制。转基因活动物，必须根据始发国和目的地国的国家主管当局的规定和条件运输。 含有转基因生物体或转基因微生物的 COVID-19 疫苗，包括正在进行临床试验的疫苗，不受本细则约束。
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Other substances or articles presenting a danger during transport, but not meeting the definitions of another class
运输过程中存在危险但不能满足其他类别定义的其他物质和物品

.....

3548	Articles containing miscellaneous dangerous goods, n.o.s. 含有杂项危险品的物品，未另作规定的	
3556	Vehicle, lithium ion battery powered 以锂离子电池为动力的车辆	
3557	Vehicle, lithium metal battery powered 以锂金属电池为动力的车辆	
3558	Vehicle, sodium ion battery powered 以钠离子电池为动力的车辆	
.....		

9.3 锂电池

对电池规定的修订

DGP/29-WP/3 号文件第 4.1.2.1.3.1 d) 段:

电池芯和电池、装在设备中的电池芯和电池，或者与设备包装在一起的电池芯和电池，如果含有任何形态的锂，都必须酌情划入 UN 3090、3091、3480 或 3481。这类电池芯和电池 ~~如果满足以下规定~~，可按上述条目进行运输，条件是：

- a) 每个电池芯或电池的所属类型证明满足联合国《试验和标准手册》第 III 部分 38.3 小节规定的每项试验的要求。

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e) 电池芯和电池**必须**按照包含以下内容的质量管理方案予以制造：

- 1) 设计和产品质量方面的组织结构和人员责任说明；
- 2) 相关检查和试验、质量控制、质量保证和使用的程序作业说明；
- 3) 程序控制应包括防止和发现在电池制造过程中出现内部短路故障的相关活动；
- 4) 质量记录，例如检查报告、试验数据、校准数据和证书。必须保存试验数据，在国家有关当局要求时予以提供；
- 5) 管理审查，确保质量管理方案的有效运作；
- 6) 文件控制和修订程序；
- 7) 对不符合联合国《试验和标准手册》第 III 部分 38.3 节试验类型的电池芯或电池采取的控制措施；
- 8) 对有关人员的培训方案和资格审查程序；
- 9) 确保最终产品无损坏的程序。

注：可以接受机构内部的质量管理方案。不需要第三方的认证，但上文 1) 至 9) 列出的程序须作适当记录并可跟踪查询。必须预备一份质量管理方案副本，在国家有关当局索要时予以提供。

- f) 非设计为可外部充电的、同时含有原锂金属电池芯和可充电锂离子电池芯的锂电池（见特殊规定 A213）**必须**符合下列条件：
- i) 仅可从原锂金属电池芯为可充电锂离子电池芯充电；
 - ii) 通过设计排除可充电锂离子电池芯过度充电；
 - iii) 电池作为原锂电池做过试验；
 - iv) 作为电池元件的电池芯**必须**是经验证符合联合国《试验和标准手册》第 III 部分第 38.3 小节各项试验要求的类型；和

《联合国规章范本》，第 2.9 章，2.9.4 (g)（参见 ST/SG/AC.10/50/Add.1）和本报告第 1.2.1.2.1 a) 段：

- g) 除安装在设备（包括电路板）上的纽扣电池外，2003 年 6 月 30 日以后生产的电池芯或电池的制造商和随后的销售商**必须**提供联合国《试验和标准手册》第 III 部分第 38.3 小节第 38.3.5 段规定的试验概要。

注：“提供”一词是指制造商和随后的经销商确保试验概要可供查阅，以便托运人或供应链中的其他人能确认合规。

为与联合国协调一致的修订

和

对电池规定的修订

DGP/29-WP/3 号文件第 4.1.2.1.3.1 d) 段：

《联合国规章范本》，第 2.9 章，2.9.5（参见 ST/SG/AC.10/50/Add.1）和本报告第 1.2.1.2.1 a) 段和第 1.2.1.2.1 b) 段：

9.4 钠离子电池

电池芯和电池、装在设备中的电池芯和电池、或与含钠离子设备包装在一起的电池芯和电池，如果是可再充电的电化学系统，其正极和负极都是嵌入化合物或插入化合物，在结构上两个电极都没有钠金属（或钠合金），而用有机非水化合物作电解质，则必须酌情划为联合国编号 3551 或 3552。

注：嵌入的钠以离子或准原子形式存在于电极材料的晶格中。

这类电池芯和电池可按上述条目运输，条件是：

a) 经过验证，每个电池芯或电池的类型均符合联合国《试验和标准手册》第三部分第 38.3 小节各项试验的要求；

注：电池的类型必须经证明符合《联合国测试和标准手册》第 III 部分第 38.3 款的测试要求，无论其组成的电池芯是否属于经过测试的类型。

b) 每一电池芯和电池都装有安全排气装置，或在设计上能防止在运输中正常遇到的条件下骤然破裂；

c) 每一电池芯和电池都装有防止外部短路的有效装置；

d) 每个包含多个并联电池芯或电池芯系列的电池，都装有防止反向电流造成危险所需的有效装置（例如二极管、保险丝等）；

e) 电池芯和电池按照 9.3 e) 1) 至 9) 规定的质量管理计划制造；

f) 电池芯或电池的制造商和随后的经销商提供联合国《试验和标准手册》第 III 部分第 38.3 小节第 38.3.5 段中规定的试验概要。

注：“提供”一词是指制造商和随后的经销商确保试验概要可供查阅，以便托运人或供应链中的其他人能确认合规。

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第 3 部分

危险物品表，特殊规定和限制数量与例外数量

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第 2 章

危险物品表（表 3-1）的编排

.....

2.1 危险物品表（表 3-1）的编排

2.1.1 危险物品表（表 3-1）分为如下 13 栏：

为与联合国保持一致而进行修订

DGP/29-WP/3 号文件第 4.1.2.1.4 段：

《联合国规章范本》第 3 章 3.2.1（见 ST/SG/AC.10/50/Add.1）

第 8 栏 “UN 包装等级” — 本栏包含物品或物质的联合国包装等级号码（即 I、II 或 III），如果该条目有一种以上相应的包装等级，待运输的物质或制品的包装等级，应根据该物品的其性质及第 2 部分第 1-9 章所列出的包装危险性等级分类标准来确定。

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表 3-1 危险物品表

名称	UN 编号	类别或项别	次要危险性	标签	国家差异条款	特殊规定	UN 包装等级	例外数量	客机		货机	
									包装说明	每个包装件最大净量	包装说明	每个包装件最大净量
1	2	3	4		6	7	8	9	10	11	12	13

为与联合国保持一致而进行修订

DGP/29-WP/3 号文件第 4.1.2.1.4 段：

《联合国规章范本》第 3.2 章，危险物品表（见 ST/SG/AC.10/50/Add.1）：

Aircraft hydraulic power unit fuel tank (containing a mixture of anhydrous hydrazine and methyl hydrazine) (M86 fuel) 航空器液压动力装置燃料箱（装有无水肼和甲基肼的混合物）（M86 号燃料）	3165	3	6.1 8	Liquid flammable & Toxic & Corrosive 易燃液体和毒性物质和腐蚀性物质	AU 1 CA 7 IR 3 NL 1 US 3	A1 A48	⚠	E0	FORBID DEN 禁运		372	42 L
Aluminium borohydride in devices 氢硼化铝	2870	4.2	4.3				⚠		FORBID DEN 禁运		FORBID DEN 禁运	

《联合国规章范本》第 2.0 章 2.0.5.2（见 ST/SG/AC.10/50/Add.1）：

Articles containing corrosive substance, n.o.s.* 含有腐蚀性物质的物品，未另作规定的*	3547	8	See 2;0.6			A2 A88			FORBID DEN 禁运		FORBID DEN 禁运	
Articles containing flammable gas, n.o.s.* 含有易燃气体的物品，未另作规定的*	3537	2.1	See 2;0.6			A2 A88			FORBID DEN 禁运		FORBID DEN 禁运	
Articles containing flammable liquid, n.o.s.* 含有易燃液体的物品，未另作规定的*	3540	3	See 2;0.6			A2 A88			FORBID DEN 禁运		FORBID DEN 禁运	
Articles containing flammable solid, n.o.s.* 含有易燃固体的物品，未另作规定的*	3541	4.1	See 2;0.6			A2 A88			FORBID DEN 禁运		FORBID DEN 禁运	

名称	UN 编号	类别 或 项别	次要 危险性	标签	国家差异 条款	特殊 规定	UN 包装 等级	例外数量	客机		货机	
									包装 说明	每个 包装件 最大净量	包装说明	每个 包装件 最大净量
1	2	3	4		6	7	8	9	10	11	12	13
Articles containing miscellaneous dangerous goods, n.o.s.* 含有杂项危险品的物品, 未另作规定的*	3548	9	See 2;0.6			A2 A88 A224			FORBIDDEN 禁运		FORBIDDEN 禁运	
Articles containing non-flammable, non toxic gas, n.o.s.* 含有非易燃、非毒性气体的物品, 未另作规定的*	3538	2.2	See 2;0.6			A2 A88 A225			FORBIDDEN 禁运		FORBIDDEN 禁运	
Articles containing toxic substance, n.o.s.* 含有毒性物质的物品, 未另作规定的*	3546	6.1	See 2;0.6			A2 A88			FORBIDDEN 禁运		FORBIDDEN 禁运	

《联合国规章范本》第 3.2 章，危险物品表（见 ST/SG/AC.10/50/Add.1）：

Batteries, containing metallic sodium or sodium alloy † 含钠金属或钠合金电 池†	3292	4.3		Danger if wet 遇水危险		A94 A183 A228		E0	FORBIDDEN 禁运		492	No limit 不限
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为与联合国保持一致而进行修订

和

对电池规定的修订

《联合国规章范本》第 3.2 章，危险物品表（见 ST/SG/AC.10/50/Add.1）和本报告第 2.2.7 段：

Batteries, wet, filled with acid, electric storage † 蓄电池, 湿的, 装有酸液, 蓄电的†	2794	8		Corrosive 腐蚀性物质		A51 A164 A183		E0	870	30 kg	870	400 kg
Batteries, wet, filled with alkali, electric storage † 蓄电池, 湿的, 装有碱液, 蓄电的†	2795	8		Corrosive 腐蚀性物质		A51 A164 A183 A228		E0	870	30 kg	870	400 kg
Batteries, wet, non-spillable, electric storage 蓄电池, 湿的, 密封的, 蓄 电的	2800	8		Corrosive 腐蚀性物质		A48 A67 A164 A183		E0	872	No limit 不限	872	No limit 不限

名称	UN 编号	类别或项别	次要危险性	标签	国家差异条款	特殊规定	UN 包装等级	例外数量	客机		货机	
									包装说明	每个包装件最大净量	包装说明	每个包装件最大净量
1	2	3	4		6	7	8	9	10	11	12	13
Battery powered equipment 电池供电设备	3171	9		Miscellaneous 杂项 危险物品		A67 A87 A94 A154 A164 A182 A214		E0	952	No limit 不限	952	No limit 不限
Battery powered equipment 电池供电设备	3171	9		Miscellaneous 杂项 危险物品		A67 A87 A94 A154 A164 A214		E0	952	No limit 不限	952	No limit 不限

《联合国规章范本》第 3.2 章，危险物品表（见 ST/SG/AC.10/50/Add.1）：

Bombs, smoke, non-explosive with corrosive liquid, without initiating device 烟幕弹, 非爆炸性, 含腐蚀性液体, 不带引爆装置	2028	8		Corrosive 腐蚀性物质			H	E0	FORBIDDEN 禁运		866	50 kg
Butadienes and hydrocarbon mixture, stabilized, containing more than 40% butadienes 丁二烯和碳氢化合物混合物, 稳定化的, 含丁二烯超过 40%	1010	2.1		Gas flammable 易燃气体	AU 1 CA 7 IR 3 NL 1 US 3	A1 A209 A229		E0	FORBIDDEN 禁运		200	150 kg

对电池规定的修订

DGP/29-WP/3 号文件第 4.2.2.2 段：

Cells, containing metallic sodium or sodium alloy † 含钠金属或钠合金电池芯†	3292	4.3		Danger if wet 遇水危险		A94 A183 A228		E0	492	25 kg	492	400 kg
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名称	UN 编号	类别或项别	次要危险性	标签	国家差异条款	特殊规定	UN 包装等级	例外数量	客机		货机	
									包装说明	每个包装件最大净量	包装说明	每个包装件最大净量
1	2	3	4		6	7	8	9	10	11	12	13

为与联合国保持一致而进行修订

DGP/29-WP/3 号文件第 4.1.2.1.4 段:

《联合国规章范本》第 3.2 章, 危险物品表 (见 ST/SG/AC.10/50/Add.1) :

Detonators, electric for blasting † 电雷管, 爆破用†	0030	1.1B				A226			FORBIDDEN 禁运		FORBIDDEN 禁运	
Detonators, electric for blasting † 电雷管, 爆破用†	0255	1.4B		Explosive 1.4 爆炸品 1.4		A226		E0	FORBIDDEN 禁运		131	75 kg
Detonators, electric for blasting † 电雷管, 爆破用†	0456	1.4S		Explosive 1.4 爆炸品 1.4		A165 A226		E0	131	25 kg	131	100 kg
Detonators, electronic programmable for blasting † 可编程电子引爆雷管, 爆破用†	0511	1.1B				A226		E0	FORBIDDEN 禁运		FORBIDDEN 禁运	
Detonators, electronic programmable for blasting † 可编程电子引爆雷管, 爆破用†	0512	1.4B		Explosive 1.4 爆炸品 1.4		A226		E0	FORBIDDEN 禁运		131	75 kg
Detonators, electronic programmable for blasting † 可编程电子引爆雷管, 爆破用†	0513	1.4S		Explosive 1.4 爆炸品 1.4		A165 A226		E0	131	25 kg	131	100 kg
Disilane 乙硅烷	3553	2.1						E0	FORBIDDEN 禁运		FORBIDDEN 禁运	

为了运输便利化而进行修订

DGP/29-WP/2 号文件第 4.3.2 段:

Engine, combustion 内燃机	internal	3530	9		Miscellaneous 杂项危险物品	A70 A87 A154 A208		E0	972	No limit 不限	972	No limit 不限
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名称	UN 编号	类别或项别	次要危险性	标签	国家差异条款	特殊规定	UN 包装等级	例外数量	客机		货机	
									包装说明	每个包装件最大净量	包装说明	每个包装件最大净量
1	2	3	4		6	7	8	9	10	11	12	13

为与联合国保持一致而进行修订

本报告第 1.2.1.8 段:

Fuel system components (including fuel control units (FCU), carburettors, fuel lines, fuel pumps), see Dangerous goods in apparatus or Dangerous Goods in articles or Dangerous Goods in machinery (UN No. 3363) 燃油系统组件（包括燃油控制器（FCU），增碳器，燃料管，燃料泵），见器械中的危险物品或物品中的危险物品或机器中的危险物品（UN 编号 3363）												
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为了运输便利化而进行修订

DGP/29-WP/2 号文件第 4.3.2 段:

Machinery, internal combustion 内燃机器	internal	3530	9		Miscellaneous 杂项危险物品		A70 A87 A154 A208		E0	972	No limit 不限	972	No limit 不限
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为与联合国保持一致而进行修订

DGP/29-WP/3 号文件第 4.1.2.1.4 段:

Fire suppressant dispersing devices† 灭火剂散布装置†	0514	1.4S		Explosive 1.4 爆炸品 1.4		A232		E0	135	25 kg	135	100 kg
Fire suppressant dispersing devices † 灭火剂散布装置†	3559	9		Miscellaneous 杂项危险物品		A232		E0	961	25 kg	961	100 kg

名称	UN 编号	类别或项别	次要危险性	标签	国家差异条款	特殊规定	UN 包装等级	例外数量	客机		货机	
									包装说明	每个包装件最大净量	包装说明	每个包装件最大净量
1	2	3	4		6	7	8	9	10	11	12	13
Gallium contained in manufactured articles 含于制成品中的镓	3554	8		Corrosive 腐蚀性物质		A48 A69		E0	869	No limit 不限	869	No limit 不限
Isosorbide dinitrate mixture with not less than 60% lactose, mannose, starch or calcium hydrogen phosphate 异山梨醇二硝酸酯混合物, 含乳糖、甘露糖、淀粉、或磷酸氢钙不低于 60%	2907	4.1		Solid flammable 易燃固体	BE 3	A40 A49	II	E0	445	15 kg	448	50 kg

为与联合国保持一致而进行修订

和

对电池规定的修订

DGP/29-WP/3 号文件第 4.1.2.1.4 段和本报告第 2.2.7 段:

Lithium ion batteries (including lithium ion polymer batteries) 锂离子电池 (包括锂离子聚合物电池)	3480	9		Miscellaneous — Lithium or sodium ion batteries 杂项危险品 — 锂或钠离子电池	US 3	A88 A99 A154 A164 A183 A201 A213		E0	FORBIDDEN 禁运		See 见	965 965
Lithium ion batteries contained in equipment (including lithium ion polymer batteries) 装在设备中的锂离子电池 (包括锂离子聚合物电池)	3481	9		Miscellaneous — Lithium or sodium ion batteries 杂项危险品 — 锂或钠离子电池	US 3	A48 A88 A99 A154 A164 A181 A185 A213 A220		E0	967	5 kg	967	35 kg
Lithium ion batteries packed with equipment (including lithium ion polymer batteries) 与设备包装在一起的锂离子电池 (包括锂离子聚合物电池)	3481	9		Miscellaneous — Lithium or sodium ion batteries 杂项危险品 — 锂或钠离子电池	US 3	A88 A99 A154 A164 A181 A185 A213		E0	966	5 kg	966	35 kg

名称	UN 编号	类别或项别	次要危险性	标签	国家差异条款	特殊规定	UN 包装等级	例外数量	客机		货机	
									包装说明	每个包装件最大净量	包装说明	每个包装件最大净量
1	2	3	4		6	7	8	9	10	11	12	13
Lithium metal batteries (including lithium alloy batteries) † 锂金属电池 (包括锂合金电池) †	3090	9		Miscellaneous — Lithium or sodium ion batteries 杂项危险物品 — 锂或钠离子电池	US 2 US 3	A88 A99 A154 A164 A183 A201 A213		E0	FORBIDDEN 禁运		See 见	968 968
Lithium metal batteries contained in equipment (including lithium alloy batteries) † 装在设备中的锂金属电池 (包括锂合金电池) †	3091	9		Miscellaneous — Lithium or sodium ion batteries 杂项危险物品 — 锂或钠离子电池	US 2 US 3	A48 A88 A99 A154 A164 A181 A185 A213 A220		E0	970	5 kg	970	35 kg
Lithium metal batteries packed with equipment (including lithium alloy batteries) † 与设备包装在一起的锂金属电池 (包括锂合金电池) †	3091	9		Miscellaneous — Lithium or sodium ion batteries 杂项危险物品 — 锂或钠离子电池	US 2 US 3	A88 A99 A154 A164 A181 A185 A213		E0	969	5 kg	969	35 kg

为与联合国保持一致而进行修订

DGP/29-WP/3 号文件第 4.1.2.1.4 段:

Nitrocellulose membrane filters with not more than 12.6% nitrogen, by dry mass 硝化纤维素滤膜, 按干燥质量计, 含氮不大于 12.6%	3270	4.1		Solid flammable 易燃固体		A73 A122 A230	II	E2	458 Y458	1 kg 1 kg	458	15 kg
Nitrocellulose solution, flammable with not more than 12.6% nitrogen, by dry mass, and not more than 55% nitrocellulose 硝化纤维素溶液, 易燃, 按干燥质量计, 含氮不大于 12.6%, 含硝化纤维素不大于 55%	2059	3		Liquid flammable 易燃液体	BE 3	A3 A40 A91	I II III	E0 E0 E0	351 353 Y341 355 Y344	1 L 5 L 1 L 60 L 10 L	361 364 366	30 L 60 L 220 L

名称	UN 编号	类别或项别	次要危险性	标签	国家差异条款	特殊规定	UN 包装等级	例外数量	客机		货机	
									包装说明	每个包装件最大净量	包装说明	每个包装件最大净量
1	2	3	4		6	7	8	9	10	11	12	13
Nitrocellulose with alcohol , not less than 25% alcohol, by mass, and not more than 12.6% nitrogen, by dry mass 含醇硝化纤维素, 按质量计, 含醇不低于 25%, 按干燥质量计, 含氮不超过 12.6%	2556	4.1		Solid flammable 易燃固体	BE 3	A40 A217	II	E0	452	1 kg	453	15 kg
Nitrocellulose with water , not less than 25% water by mass 含水硝化纤维素, 按质量计, 含水不低于 25%	2555	4.1		Solid flammable 易燃固体	BE 3	A40 A217	II	E0	452	15 kg	453	50 kg
Nitroglycerin mixture, desensitized, liquid, n.o.s.* with not more than 30% nitroglycerin, by mass 液态硝化甘油混合物, 减敏的, 未另作规定的*, 按质量计, 含硝化甘油不超过 30%	3357	3			BE 3	A17 A40	II		FORBIDDEN 禁运		FORBIDDEN 禁运	
Nitroglycerin mixture, desensitized, liquid flammable, n.o.s.* with not more than 30% nitroglycerin, by mass 液态硝化甘油混合物, 减敏的, 易燃, 未另作规定的*, 按质量计, 含硝化甘油不超过 30%	3343	3			BE 3	A40			FORBIDDEN 禁运		FORBIDDEN 禁运	
Nitroglycerin mixture, desensitized, solid, n.o.s.* with more than 2% but not more than 10% nitroglycerin, by mass 固态硝化甘油混合物, 减敏的, 未另作规定的*, 按质量计, 含硝化甘油高于 2%, 但不高于 10%	3319	4.1		Solid flammable 易燃固体	AU 1 BE 3 CA 7 IR 3 NL 1 US 3	A1 A40 A68	II	E0	FORBIDDEN 禁运		499	0.5 kg
Nitroglycerin solution in alcohol with more than 1% but not more than 5% nitroglycerin 硝化甘油酒精溶液, 含硝化甘油高于 1%, 但不高于 5%	3064	3		Liquid flammable 易燃液体	BE 3	A40 A188	II	E0	FORBIDDEN 禁运		371	5 L
Nitroglycerin solution in alcohol with not more than 1% nitroglycerin 硝化甘油乙醇溶液, 含硝化甘油不大于 1%	1204	3		Liquid flammable 易燃液体		A40	II	E0	371 Y341	5 L 1 L	371	60 L

名称	UN 编号	类别或项别	次要危险性	标签	国家差异条款	特殊规定	UN 包装等级	例外数量	客机		货机	
									包装说明	每个包装件最大净量	包装说明	每个包装件最大净量
1	2	3	4		6	7	8	9	10	11	12	13
Pentaerythrite tetranitrate mixture desensitized, solid, n.o.s.* with more than 10% but not more than 20% PETN, by mass 固态季戊四醇四硝酸酯混合物, 减敏的, 未另作规定的*, 按质量计, 含季戊四醇四硝酸酯高于 10%, 但不超过 20%	3344	4.1			BE 3	A40	II		FORBIDDEN 禁运		FORBIDDEN 禁运	
Pentaerythritol tetranitrate mixture desensitized, solid, n.o.s.* with more than 10% but not more than 20% PETN, by mass 固态季戊四醇四硝酸酯混合物, 减敏的, 未另作规定的*, 按质量计, 含季戊四醇四硝酸酯高于 10%, 但不超过 20%	3344	4.1			BE 3	A40	II		FORBIDDEN 禁运		FORBIDDEN 禁运	
PETN mixture desensitized, solid, n.o.s.* with more than 10% but not more than 20% PETN, by mass 固态喷梯尔混合物, 减敏的, 未另作规定的*按质量计, 含喷梯尔大于 10%, 但不大于 20%	3344	4.1			BE 3	A40	II		FORBIDDEN 禁运		FORBIDDEN 禁运	

为与联合国保持一致而进行修订

和

对电池规定的修订

DGP/29-WP/3 号文件第 4.1.2.1.4 段和本报告第 2.2.7 段:

Sodium ion batteries with organic electrolyte 含有机电解质的钠离子电池	3551	9		Miscellaneous — Lithium or sodium ion batteries 杂项 — 锂或钠离子电池		A88 A99 A154 A183 A227 A228		E0	FORBIDDEN 禁运		See 976 见 976	
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名称	UN 编号	类别或项别	次要危险性	标签	国家差异条款	特殊规定	UN 包装等级	例外数量	客机		货机	
									包装说明	每个包装件最大净量	包装说明	每个包装件最大净量
1	2	3	4		6	7	8	9	10	11	12	13
Sodium ion batteries contained in equipment with organic electrolyte 含有机电解质的装在设备中的钠离子电池	3552	9		Miscellaneous — Lithium or sodium ion batteries 杂项 — 锂或钠离子电池		A48 A88 A99 A154 A185 A227 A228		E0	97Y	5 kg	97Y	35 kg
Sodium ion batteries packed with equipment with organic electrolyte 含有机电解质的与设备包装在一起的钠离子电池	3552	9		Miscellaneous — Lithium or sodium ion batteries 杂项 — 锂或钠离子电池		A48 A88 A99 A154 A185 A227 A228		E0	97Y	5 kg	97Y	35 kg

为与联合国保持一致而进行修订

DGP/29-WP/3 号文件第 4.1.2.1.4 段:

Tetramethylammonium hydroxide, solid 固态氢氧化四甲铵	3423	8.1	8	Toxic & Corrosive 毒性和腐蚀性物质		A113 A234	III	E2E5	859 ¥844 665	15 kg 5 kg 1 kg	863 672	50 kg 15 kg
Tetramethylammonium hydroxide aqueous solution with not less than 25% tetramethylammonium hydroxide 氢氧化四甲铵水溶液, 氢氧化四甲铵含量不少于 25%	3560	6.1	8	Toxic & Corrosive 毒性和腐蚀性物质		A113 A233 A234	I	E5	651	0.5 L	657	2.5 L
Tetramethylammonium hydroxide aqueous solution with more than 2.5% but less than 25% tetramethylammonium hydroxide 氢氧化四甲铵水溶液, 氢氧化四甲铵含量大于 2.5% 但小于 25%	1835	8	6.1	Corrosive & Toxic 腐蚀性和毒性物质		A3 A113 A233 A234	II III	E2 E1	851 Y840 852 ¥841	1 L 0.5 L 5 L 1 L	855 856	30 L 60 L
Tetramethylammonium hydroxide aqueous solution with not more than 2.5% tetramethylammonium hydroxide 氢氧化四甲铵水溶液, 氢氧化四甲铵含量不超过 2.5%	1835	8		Corrosive 腐蚀性物质		A3 A233 A234	III	E1	852 Y841	5 L 1 L	856	60 L

名称	UN 编号	类别 或 项别	次要 危险性	标签	国家差异 条款	特殊 规定	UN 包装 等级	例外数量	客机		货机	
									包装 说明	每个 包装件 最大净量	包装说明	每个 包装件 最大净量
1	2	3	4		6	7	8	9	10	11	12	13
Trifluoromethyltetrazole sodium salt in acetone with not less than 68% acetone, by mass 三氟甲基四氮唑钠盐的丙酮溶液，按质量含丙酮不低于68%	3555	3		Liquid flammable 易燃液体		A40	II	E0	FORBIDDEN 禁运		FORBIDDEN 禁运	

为与联合国保持一致而进行修订

和

对电池规定的修订

DGP/29-WP/3 号文件第 4.1.2.1.4 段和本报告第 2.2.7 段：

Vehicle, lithium ion battery powered 以锂离子电池为动力的车辆	3556	9		Miscellaneous — Lithium or sodium ion batteries 杂项 — 锂或钠离子电池		A87 A118 A120 A154 A214		E0	952	No limit 不限	952	No limit 不限
Vehicle, lithium metal battery powered 以锂金属电池为动力的车辆	3557	9		Miscellaneous — Lithium or sodium ion batteries 杂项 — 锂或钠离子电池		A87 A118 A120 A154 A214		E0	952	No limit 不限	952	No limit 不限
Vehicle, sodium ion battery powered 以钠离子电池为动力的车辆	3558	9		Miscellaneous — Lithium or sodium ion batteries 杂项 — 锂或钠离子电池		A87 A118 A120 A154 A214 A231		E0	952	No limit 不限	952	No limit 不限

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为与联合国保持一致而进行修订

表 3-1 危险物品表

仅对表 3-1 中文版进行的修订：

DGP/29-WP/2 号文件第 4.1.2.2 段：

名称	UN 编号	类别或项别	次要危险性	标签	国家差异条款	特殊规定	UN 包装等级	例外数量	客机		货机	
									包装说明	每个包装件最大净量	包装说明	每个包装件最大净量
1	2	3	4	5	6	7	8	9	10	11	12	13
Guanyl nitrosaminoguanylidene hydrazine, wetted with not less than 30% water, by mass 胍基-亚硝氨基胍基胍，湿的，按质量计，含水不低于 30%	0113	1.1A							FORBIDDEN 禁运		FORBIDDEN 禁运	
Ethyl methyl ketone 乙基-甲基甲乙酮	1193	3		Liquid flammable 易燃液体			II	E2	353 Y341	5 L 1 L	364	60 L
Hydrogen cyanide, aqueous solution with not more than 20% hydrogen cyanide or Hydrocyanic acid, aqueous solution with not more than 20% hydrogen cyanide 氢氰酸氰化氢水溶液，含氢化氰不超过 20% 或氢氰酸水溶液，含氢化氰不超过 20%	1613	6.1							FORBIDDEN 禁运		FORBIDDEN 禁运	
Calcium hydrosulphite 连二亚硫酸氢钙	1923	4.2		Spontaneous combustion 自燃物质			II	E2	467	15 kg	470	50 kg
Dibromodifluoromethane 丙酸二溴二氟甲烷	1941	9		Miscellaneous 杂项危险物品			III	E1	964	100 L	964	220 L

名称	UN 编号	类别 或 项别	次要 危险 性	标签	国家 差异 条款	特殊 规定	UN 包装 等级	例外数量	客机		货机	
									包装 说明	每个 包装件 最大净量	包装 说明	每个 包装件 最大净量
1	2	3	4	5	6	7	8	9	10	11	12	13
Pentane-2, 4-dione 戊-2, 4-戊二酮	2310	3	6.1	Liquid flammable & Toxic 易燃液体和 毒性物质			III	E1	355 Y343	60 L 2 L	366	220 L
Adsorbed gas, toxic, flammable, n.o.s.* 吸附气体, 毒性, 易燃, 未另作规定的*	3514	2.3	2.1		AU 1 CA 7 IR 3 NL 1 US 3	A2		E0	FORBIDDEN 禁运		FORBIDDEN 禁运	
Adsorbed gas, toxic, flammable, corrosive, n.o.s.* 吸附气体, 毒性, 易燃, 腐蚀性, 未另作规定的*	3517	2.3	2.1 8		AU 1 CA 7 IR 3 NL 1 US 3	A2		E0	FORBIDDEN 禁运		FORBIDDEN 禁运	
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第 3 章

特殊规定

表 3-2 特殊规定

本细则 UN

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为与联合国保持一致而进行修订

DGP/29-WP/3 号文件第 4.1.2.1.4 段:

《联合国规章范本》第 3.3 章 SP 28 (见 ST/SG/AC.10/50/Add.1) :

A40 (28) 这种物质只有在其包装方式可保证稀释剂的百分含量不会降到所要求的比例以下时才可以按照第 3 类或 4.1 项的规定运输 (见第 2 部分 3.1.4 和第 2 部分 4.2.4)。如未说明稀释剂, 对该物质进行的包装必须确保爆炸性物质的数量不超过所述数值。

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A67 (~238) 电池在以下的振动试验和压差试验中, 如果没有电池液流出, 可认为是防漏型电池。

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为管理航空特有风险的修订

本报告第 2.2.3 段:

防漏型电池如果在 55°C 的温度条件下, 电解液不会流出破裂的外壳, 作为货物运输时可不受本细则限制。电池不得包含任何游离液体或未吸收的液体。具有潜在放热危险性的任何带电电池或以电池为动力的装置、设备或车辆必须做好运输准备, 以防止下列情形:

- a) 短路现象 (例如: 对于电池, 对裸露的电极做有效的绝缘处理; 对于设备, 断开电池的连接, 对裸露的电极做绝缘保护); 和
- b) 意外启动。

在发布航空货运单时, 货运单上必须标明“不受限制”的字样和特殊规定号 A67。

本细则 UN

《联合国规章范本》第 3.3 章，SP 365 和 366 通过的继发修订、修改

A69 下列物品作为货物运输时，不受本细则限制：

- a) 除灯具之外，诸如温度计、交换器和继电器等物品，每个物品包含的汞或镓总量不超过 15 g，且作为机器或设备的组成部分安装其中并得到固定，从而在正常运输条件下不会发生造成汞或镓泄漏的冲击或撞击损坏。
- b) 除灯具之外，包含不超过 100 mg 汞、镓或惰性气体的物品，经包装后每个包装件所含的汞、镓或惰性气体的量是 1 g 或更低。

在发布航空货运单时，必须在航空货运单上标明“不受限制”的字样和特殊规定号 A69。

注：含有危险物品的灯具，见第 1 部分 2.6。

为了运输便利化或国家监督而进行修订

DGP/29-WP/2 号文件第 4.3.2 段：

A70 内燃发动机或燃料电池发动机或机器无论是单独运输还是装入一个车辆、机器或其他装置内运输，并且没有电池或其他危险物品，作为货物运输时则不受本细则限制，但须满足以下条件：

- a) 易燃液体燃料驱动的发动机：
 - 1) 发动机的动力来源是一种不符合任何类别或项别划分标准的液体燃料；或
 - 2) 车辆、机器或其他装置的燃料箱从未装过任何燃料，或者燃料箱已经过冲洗，清除了蒸汽，并已采取适当措施消除风险；和
 - 3) 发动机的整个燃料系统没有游离液体，所有燃料管路都已密封或拧紧盖好，或与发动机和车辆、机器或装置牢固连接。
- b) 易燃气体驱动的内燃发动机或燃料电池发动机：
 - 1) 整个燃料系统必须经过冲洗、清洁并充填了非易燃气体或液体以消除危险；
 - 2) 用于充填系统的非易燃气体的最终压力在 20°C 时不超过 200 kPa；
 - 3) 托运人事先与运营人做好安排；和
 - 4) 托运人向运营人提供了书面或电子文件，声明已经遵守了冲洗、清洁和充填程序，发动机的最终内装物经过测试和验证为非易燃物。

可以用一个集装箱运载多个发动机，但托运人必须事先就每批托运货物与运营人做好安排。

如果使用本条特殊规定，则在发布航空货运单时，必须在货运单上标明“不受限制”的字样和特殊规定号 A70。

内燃发动机或燃料电池发动机或机器无论是单独运输还是装入一个车辆、机器或其他装置内运输，并且没有电池或其他危险物品，作为货物运输时则不受本细则限制，但须满足以下条件：

本细则 UN

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为与联合国保持一致而进行修订

和

对电池规定的修订

DGP/29-WP/3 号文件第 4.1.2.1.4 段和本报告第 1.2.1.3.1 a) 段:

《联合国规章范本》第 3.3 章, SP 310 通过的继发修订、修改

A88 出于试验目的予以运输的生产之前的锂**电池或**电池芯或**电池或**钠离子**电池芯或**电池原型或低产量（即年度生产量不超过 100 个锂**电池或**电池芯或**电池或**钠离子**电池芯或**电池）的锂**电池或**电池芯或**电池或**钠离子**电池芯或**电池，没有按联合国《试验和标准手册》的第 III 部分 38.3 节的要求进行过测试的，如果经始发国和运营人所属国有关当局的批准并且满足补篇的包装说明 910 中的要求，可以在货机上运输。

托运货物必须随附一份列有数量限制的批准文件。必须在危险物品运输文件上注明按本特殊规定进行运输。

无论表 3-1 第 13 栏规定的限制为何，准备交运的电池芯或电池的质量可以超过 35 千克。

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《联合国规章范本》第 3.3 章, SP 310 通过的继发修订、修改和本报告第 1.2.1.2.1 a) 段:

A99 无论表 3-1 第 13 栏和包装说明 965、966、967、968、969 **和** 970、976、977 和 978 第 I 节规定的货机数量限制如何，锂**电池芯或**电池或**钠离子**电池芯或**电池**（即 UN 3090、**或** UN 3480 **或** UN3551），包括与设备装在一起或装在设备中的锂**电池芯或**电池（即 UN 3091、**或** UN 3481 **或** UN3552），符合有关包装说明第 I 节的其他要求的，如果经始发国和运营人所属国有关当局批准且满足补篇包装说明 974 的要求，质量可以超过 35 kg。

托运货物必须随附一份批准文件。必须在危险物品运输文件上注明按本特殊规定进行运输。

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为了运输便利化或国家监督而进行修订

DGP/29-WP/3 号文件第 4.3.2 段:

A107 (≈301) 本条目仅适用于物品包装的残留物或物品的组成部分是危险物品的物品，如机器、装置或设备。如该机械或装置在表 3-1 中已经有了运输专用名称，则不得使用本条目。

本细则 UN

如果作为物品的组成部分含有的危险物品的数量超过包装说明 962 所允许的限量，且危险物品符合《联合国规章范本》的特殊规定 301 的规定，则该物品只能在始发国和运营人所属国有关当局根据其制定的书面条件预先批准的情况下才能运输。

虽然包装说明 962 中规定了数量，但物品还可能含有最多 5 千克 UN 3077 — 对环境有危害的固态物质，未另作规定的，和/或 5 公升 UN 3082 — 对环境有危害的液态物质，未另作规定的。危险物品运输文件上不得标明对环境有危害的物质的数量。

仅含有 UN 3077 — 对环境有危害的固态物质，未另作规定的，和/或 UN 3082 — 对环境有危害的液态物质，未另作规定的物品，数量不超过 5 公升或 5 千克的物品不受本细则限制。

注：本特殊规定适用于 UN 3363 — 物品中的危险物品，机器中的危险物品和装置中的危险物品。这些细则对这些物件的每一种适用同样的要求。如果物品中危险物品的数量超过《联合国规章范本》特殊规定 301 允许的数量，或者是《联合国规章范本》不允许作为限量的危险物品，则该物品的分类必须符合第 2 部分引言章 6.1 至 6.6 的规定。

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为与联合国保持一致而进行修订

DGP/29-WP/3 号文件第 4.1.2.1.4 段：

《联合国规章范本》第 3.3 章，SP 280（见 ST/SG/AC.10/50/Add.1）：

A115 (280) 本条目适用于车辆、船舶或航空器的安全装置，例如救生气囊充气装置、气囊组件、座椅安全带预紧装置和烟火机械装置，并且包含第 1 类危险品或其他类危险品的物品。作为组件运输，如果这些物品在提交运输时已按联合国《试验和标准手册》第 I 部分的试验系列 6 c) 进行过试验，装置没有爆炸，装置的壳体或压力贮器没有碎裂，而且没有明显阻碍就近采取消防或其他应急措施的抛射危险性或热效应。

本条目不适用于包装细则说明 955（UN 2990 和 3072）所述的救生装置或灭火剂散布装置（UN 0514 和 3559）。

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对电池规定的修订

DGP/29-WP/2 号文件第 4.3.4 段和本报告第 2.2.3 段：

A123 本条目适用于在表 3-1 中未另行列出的“Batteries, electric storage”（蓄电池）。此种电池如：碱锰电池、锌碳电池和镍镉电池。具有潜在放热危险性的任何带电电池或以电池为动力的装置、设备或车辆都必须做好运输准备，以防止下列情形：

- a) 短路现象（例如：对于电池，对裸露的电极做有效的绝缘处理；对于设备，断开电池的连接，对裸露的电极做绝缘保护）；和
- b) 意外启动。

在发布航空货运单时，货运单上必须标明“不受限制”的字样和特殊规定号 A123。

射频识别（RFID）标签、手表和温度记录仪等无法产生危险热量的装置，在故意激活状态下可以运输。这些装置在激活状态下，必须满足规定的电磁辐射标准，确保装置的运行不会对航空器系统产生干扰。必须确保运输途中该装置不会发出干扰信号（如蜂鸣警报、灯光闪烁等）。

本细则 UN

为与联合国保持一致而进行修订

DGP/29-WP/3 号文件第 4.1.2.1.4 段：

《联合国规章范本》第 3.3 章，SP 252（见 ST/SG/AC.10/50/Add.1）：

A129 (252) ~~如果硝酸铵在运输的各种条件下都能保持在溶液中，含可燃物质不超过 0.2%，浓度不超过 80%的硝酸铵水溶液，作为货物运输时不受本细则限制。~~硝酸铵热浓缩溶液在下列条件下可在本条目下运输：

- a) 溶液中硝酸铵的含量不得超过 93%；
- b) 该溶液含有至少 7%的水；
- c) 溶液中可燃物含量不超过 0.2%；
- d) 该溶液不含氯离子含量超过 0.02%的氯化物；
- e) 在 25 °C 下测量，该物质含量为 10%的水溶液的 pH 值在 5 和 7 之间；以及
- f) 溶液的最高允许运输温度为 140 °C。

此外，硝酸铵热浓缩溶液作为货物运输时，在下列条件下不受本细则限制：

- a) 溶液中硝酸铵含量不超过 80%；
- b) 溶液中可燃物含量不超过 0.2%；
- c) 硝酸铵在所有运输条件下都保持在溶液中；和
- d) 该溶液不符合任何其他类或项的标准。

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《联合国规章范本》第 3.3 章，SP 328（见 ST/SG/AC.10/50/Add.1）：

A146 (328) 本条目适用于燃料电池盒，包括装在设备中的或与设备包装在一起的燃料电池盒。装在燃料电池系统中的或作为燃料电池系统一部分的燃料电池盒，均被视为是装在设备中的燃料电池盒。燃料电池盒系指储存燃料、通过阀门控制向燃料电池释放燃料的物品。燃料电池盒，包括装在设备中的燃料电池盒，其设计和构造必须能够防止燃料在正常运输条件下泄漏。

使用液体燃料的燃料电池盒，其设计类型必须通过 100kPa（表压）的内部压力试验，而不发生泄漏。

除了含有金属氢化物的氢燃料电池盒必须符合特殊规定 A162 之外，其他各种燃料电池盒的设计类型，包括装在燃料电池系统中的或作为燃料电池系统一部分的燃料电池盒，都必须表明在最有可能造成装载系统破坏的方向上，能够通过坚硬表面上进行的 1.2 米的跌落试验，并无内装物外漏。

装在燃料电池系统内的锂金属电池、~~或~~锂离子电池或钠离子电池托运货物，必须按照本条目，并按相应的 UN 3091 “装在设备中的锂金属电池”、~~或~~UN 3481 “装在设备中的锂离子电池”或 UN 3552 “装在设备中的钠离子电池”的条目规定予以托运。

本细则 UN

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为与联合国保持一致而进行修订

和

对电池规定的修订

《联合国规章范本》第 3.3 章，SP 376（见 ST/SG/AC.10/50/Add.1）和
本报告第 1.2.1.3.1 a) 段：

A154 (≈376) 禁止运输被确定为具有安全方面缺陷、可能会产生导致危险的热量、造成火情或短路的锂离子电池芯或电池和、锂金属电池芯或电池和钠离子电池芯或电池（例如那些出于安全原因退还给制造商的或在运输前无法被判定为有缺陷的电池芯或电池）。

禁止运输被确定为已经损坏，从而与根据联合国《试验和标准手册》相关规定所作试验类型不符的锂离子电池芯或电池和、锂金属电池芯或电池和钠离子电池芯或电池。在本特殊规定中，这可能包括但不限于：

- a) 有泄漏或漏气的电池芯或电池；
- b) 在运输前无法做出准确判断的电池芯或电池；或
- c) 存在物理或机械损坏的电池芯或电池。

在评估电池芯或电池是否存在缺陷或受损时，必须根据该电池芯、电池或产品制造商提供的安全标准加以评估或衡量，或由知晓该电池芯或电池安全特性的技术专家进行评估或衡量。评估或衡量可包括但不限于以下标准：

- a) 急性危险，如气体、明火或电解质的泄露；
- b) 电池芯或电池的使用或误用情况；
- c) 物理损坏迹象，如电池芯或电池外壳变形，或外壳色斑；
- d) 外部和内部短路保护，如电压或隔离措施；
- e) 电池芯或电池安全特性状况；或
- f) 电池管理系统等任何内部安全组件的损伤。

见本报告第 2.2.7 段：

A164 ~~具有潜在放热危险性的任何带电电池或以电池为动力的装置、设备或车辆都必须做好运输准备，以防止下列情形：—~~

~~a) 短路现象（例如：对于电池，对裸露的电极做有效的绝缘处理；对于设备，断开电池的连接，对裸露的电极做绝缘保护）；和~~

~~b) 意外启动。—~~

未使用。

DGP/29-WP/3 号文件第 4.2.2.2 段：

A183 除非经过始发国和运营人所属国的国家有关当局批准，否则禁止航空运输废电池芯和电池和为回收或处理目的运输的电池芯或电池。

本细则 UN

《联合国规章范本》第 3.3 章，SP 360（见 ST/SG/AC.10/50/Add.1）：

A185 (360) 完全由锂金属电池、或锂离子电池或钠离子电池驱动的车辆，必须划为 UN 3171 “电池供电车辆”酌情归入 UN 3556，以锂离子电池为动力的车辆，或 UN 3557，以锂金属电池为动力的车辆，或 UN 3558，以钠离子电池为动力的车辆。

安装在货物运输装置中、仅用于向运输装置提供外部供电的锂电池，必须划为 UN 3536 装在货运装置中的锂电池。

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为了运输便利化或国家监督而进行修订

DGP/29-WP/3 号文件第 4.3.1 段：

A190 (373) 含有超过 1 克非加压三氟化硼气体的中子辐射探测器组件可根据本条目运输，但必须满足以下条件：

a) 三氟化硼含量超过 1 克的辐射探测器和装有中子辐射探测器组件的辐射探测系统，可以按照本细则的所有适用要求用货机运输，而不必考虑表 3-1 第 12 栏和 13 栏所注的“禁运”标志，并且按照每个包装件上显示的“有毒气体”和“腐蚀性”标志，而不必考虑第 5 栏没有标明这些标志的问题，但必须满足以下条件：

ai) 每个辐射探测器都必须满足下列条件：

i1) 每个中子辐射探测器的压力在 20°C 不得超过 105 千帕绝对值；

ii2) 每个探测器的气体量不得超过 13 克；

iii3) 每个探测器必须根据在册质量保证方案进行制造；

注：为此目的而适用 ISO 9001: 2008 被认为是可接受的。

iv4) 每个中子辐射探测器必须是钎焊金属陶瓷馈通组件式的金属结构。这些探测器的最小爆破压力经设计类型合格测试证明必须为 1 800 千帕；和

v5) 每个探测器在填充之前必须按照 1×10^{-10} cm³/s 密封性标准进行测试。

bii) 作为单独部件运输的辐射探测器必须按照如下方式进行运输：

i1) 它们必须使用密封中间内衬塑料包装，具有足够的吸收或吸附材料以吸收或吸附全部气体含量；

ii2) 它们必须使用坚固的外包装，完整的包装件必须能够承受 1.8 米跌落试验，且气体含量不会从探测器中渗漏；和

iii3) 所有探测器外包装的气体总量不得超过 52 克。

ei) 含有满足小节 ai) 条件的探测器的完整的中子辐射探测系统必须按照下列方式进行运输：

i1) 探测器必须装在坚固密封的外壳内；

ii2) 外壳必须包含吸收或吸附中子辐射探测器全部气体含量的足够的吸收或吸附材料；和

iii3) 完整的系统必须装在能承受 1.8 米跌落试验而不渗漏的坚固的外包装之中，除非系统外壳能提供同等的保护；

iv) 无论第 5 栏中是否有标签标明，每个包装件必须贴有“有毒气体”和“腐蚀性”危险标签；

本细则 UN

v) 按照本特殊规定运输，必须在危险物品运输文件上予以注明。运输文件上不得标有包装说明。

如满足了上述条件，则不适用特殊规定 A2 的要求。

b) ~~虽然第 10 栏至 13 栏有“禁运”标志，但其所含三氟化硼含量不超过 1 克的中子辐射探测器，包括那些有焊料玻璃接缝的中子辐射探测器和包含此类探测器的辐射探测系统，如果它们满足以下条件~~ ~~小节 a) 的要求并按照小节 b) 进行包装~~，则在作为货物运输时不受本细则限制：~~—~~

i) ~~如果包含此类探测器的辐射探测系统~~每个辐射探测器必须满足小节 a) i) 的要求并按照小节 a) ii) 进行包装；

ii) 包含此类探测器的辐射探测系统必须根据小节 ~~e) a) iii)~~进行包装，~~则不受本细则限制。~~；和

iii) 如果使用航空货运单，则必须在货运单上标明“不受限制”的字样和特殊规定号码 A190。

如满足了上述条件，则不适用特殊规定 A2 的要求。

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为与联合国保持一致而进行修订

DGP/29-WP/2 号文件第 4.1.2.1.4 段：

《联合国规章范本》第 3.3 章，SP 371（见 ST/SG/AC.10/50/Add.1）：

A195 (371) 1) 本条目也适用于包含带有释放装置的小型压力贮器的物品。这些物品必须符合下列要求：

- a) 压力贮器的容量不得超过 0.5 升，工作压力在 15 摄氏度时不得超过 25 巴；
- b) 压力贮器的最低爆破压力在 15 摄氏度时必须至少为气压的四倍；
- c) 每一物品都必须用以下方式制造：在操作、包装、运输和使用的正常条件下避免非故意的点火或释放。这可通过和催化剂相关的额外闭锁装置实现；
- d) 每一物品都必须用避免压力贮器或压力贮器部件的有害性发射的方式制造；
- e) 每一压力贮器必须由破裂时不会碎裂的材料制成；
- f) 物品的设计类型必须接受着火点测试。关于该测试，必须适用《联合国测试和标准手册》中 16.6.1.2 除小节 g) 之外的条款、16.6.1.3.1 至 16.6.1.3.4、16.6.1.3.6、16.6.1.3.7 分节 b) 以及 16.6.1.3.8。必须证明该物品通过火降解封条或其他压力释放装置释放压力时不会造成压力贮器碎裂，并且该物品或该物品的碎片不会冲到 10 米以上；
- g) 物品的设计类型必须接受下列测试。在包装过程中必须采用激发机制来起动一物品。在包装件外部不得存在有害影响，如包装破坏、金属碎片或容器穿过包装。

2) 制造商必须提供关于设计类型、生产以及测试和测试结果的技术性文件。制造商必须采用程序，以确保所制造的系列物品质量良好，符合设计类型且能够达到 1) 的要求。制造商必须根据要求向适当的国家当局提供该信息。

本细则 UN

对电池规定的修订

DGP/29-WP/2 号文件第 4.3.4 段和本报告第 2.2.3 段：

A199 **具有潜在放热危险性的**镍氢电池或以镍氢电池为动力的装置、设备或车辆不受本细则限制，前提是它们都必须做好运输准备，以防止下列情形：

- a) 短路现象（例如：对于电池，对裸露的电极做有效的绝缘处理；对于设备，断开电池的连接，对裸露的电极做绝缘保护）；和
- b) 意外启动。

在发布航空货运单时，货运单上必须标明“不受限制”的字样和特殊规定号 A199。

射频识别（RFID）标签、手表和温度记录仪等无法产生危险热量的装置，在故意激活状态下可以运输。这些装置在激活状态下，必须满足规定的电磁辐射标准，确保装置的运行不会对航空器系统产生干扰。必须确保运输途中该装置不会发出干扰信号（如蜂鸣警报、灯光闪烁等）。

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为与联合国保持一致而进行修订

和

对电池规定的修订

DGP/29-WP/2 号文件第 4.1.2.1.4 段：

《联合国规章范本》第 3.3 章，SP 388（见 ST/SG/AC.10/50/Add.1）和第 1.2.1.3.1 b) 段：

A214 (388) UN 3166 各条目适用于以易燃液体或易燃气体内燃机或燃料电池为动力的车辆。

燃料电池发动机驱动的车辆必须酌情划归如下条目：UN 3166 易燃气体驱动的燃料电池车辆或 UN 3166 易燃液体驱动的燃料电池车辆。这些条目包含以燃料电池和装有湿电池、钠电池、锂金属电池或锂离子电池的内燃机共同驱动的混合动力电动车辆，这些车辆在运输时装有电池。

其他装有内燃发动机的车辆必须酌情划归如下条目：UN 3166 易燃气体驱动的车辆或 UN 3166 易燃液体驱动的车辆。这些条目包含以内燃发动机和湿电池、钠电池、锂金属电池或锂离子电池共同驱动的混合动力电动车辆，这些车辆在运输时装有电池。

如果车辆以一台易燃液体内燃机和一台易燃气体内燃机提供动力，则必须划为 UN 3166 易燃气体驱动的车辆。

条目 UN 3171 仅适用于以湿电池、钠金属电池或钠合金电池、~~锂金属电池或锂离子电池~~提供动力的车辆和~~设备和以湿电池或钠电池提供动力的设备~~，这些车辆和设备在运输时装有电池。

UN 3556 以锂离子电池为动力的车辆、UN 3557 以锂金属电池为动力的车辆和 UN 3558 以钠离子电池为动力的车辆，分别适用于在装有电池情况下运输的以锂离子、锂金属或钠离子电池为动力的车辆。

对本项特殊规定而言，车辆是自推进式装置，用于运载一人或多人，或用于运载物品。这类车辆的例子有汽车、摩托车、轻骑、三轮和四轮车辆或摩托车、卡车、机车、自行车（带马达的脚踏车）和其他这类车辆（如自平衡车辆或未设置至少一个座位的车辆）、轮椅、草坪拖拉机、自力推进式农用和建筑设备、船只和航空器。~~这里面包括放在包装中运输的车辆时。在这种情况下~~，除电池外，车辆的某些部分可从外壳上拆下，以便装入包装。

本细则 UN

所指设备的例子包括割草机、清洁机或模型船和模型飞机。以锂金属电池或锂离子电池为动力的设备必须酌情划归如下条目：UN 3091 装在设备中的锂金属电池或 UN 3091 与设备包装在一起的锂金属电池或 UN 3481 装在设备中的锂离子电池或 UN 3481 与设备包装在一起的锂离子电池。安装在货物运输装置中、仅用于向货运装置提供外部供电的锂离子电池或锂金属电池，必须划为 UN 3536 装在货运装置中的锂电池。

为与联合国保持一致而进行修订

《联合国规章范本》第 3.3 章，SP 399（见 ST/SG/AC.10/50/Add.1）：

A226 (399) 对于符合附录 2 中所述定义并划为联合国编号 0511、0512 和 0513 的电引爆雷管，电雷管条目（联合国编号 0030、0255 和 0456）可继续使用至 2025 年 6 月 30 日。

为与联合国保持一致而进行修订

和

对电池规定的修订

DGP/29-WP/2 号文件第 4.1.2.1.4 段：

《联合国规章范本》第 3.3 章，SP 401（见 ST/SG/AC.10/50/Add.1）：

A228 (401) 含有有机电解质的钠离子电池芯和电池必须酌情按 UN 3551 或 UN 3552 运输。含有碱性电解质水溶液的钠离子电池必须作为“UN 2795 电池，湿的，装有碱液，蓄电”运输。

为与联合国保持一致而进行修订

《联合国规章范本》第 3.3 章，SP 402（见 ST/SG/AC.10/50/Add.1）：

A229 (402) 在本条目下运输的物质在 70°C 时的蒸气压不得超过 1.1 兆帕（11 巴），在 50°C 时的密度不得低于 0.525 千克/升。

《联合国规章范本》第 3.3 章，SP 403（见 ST/SG/AC.10/50/Add.1）：

A230 (403) 本条目所包括的硝化纤维素（NC）薄膜过滤器，NC 含量不超过 53 克/平方米，每个内包装的 NC 净重不超过 300 克时，如符合下列条件，则不受本细则要求的限制：

- a) 每层 NC 膜过滤器之间放置至少 80 克/平方米的纸质隔离物；
- b) 它们的包装可保持 NC 膜过滤器和纸分离器在以下任何配置中对齐：
 - 1) 根据 ISO 15105-1:2007 标准，以紧密卷起的形式包装在至少 80 克/平方米的塑料箔或透氧率等于或小于 0.1% 的铝袋中；
 - 2) 根据 ISO 15105-1:2007 标准，以片材形式包装在至少 250 克/平方米纸板或透氧率等于或小于 0.1% 的铝袋中；

本细则 UN

- 3) 圆形过滤器包装在圆盘托架或最小重量为 250 克/平方米的纸板包装中，或单片包装在纸和塑料制作的袋中，袋的合计重量规格最小为 100 克/平方米。

为与联合国保持一致而进行修订

和

对电池规定的修订

《联合国规章范本》第 3.3 章，SP 404（见 ST/SG/AC.10/50/Add.1）：

- A231 (404) 不含有其他危险物品的以钠离子电池为动力的车辆，如果电池以电池不包含电能的方式短路，则不受本细则其他规定的限制。电池的短路必须易于验证（例如端子之间的母线）。

为与联合国保持一致而进行修订

《联合国规章范本》第 3.3 章，SP 406（见 ST/SG/AC.10/50/Add.1）

和

DGP/29-WP/3 号文件第 4.1.2.1.4.1 a) 段：

- ~~A23X (406) 当装在容量不超过 4 000 毫升的压力贮器中运输时，可按照第 3.4 章的限量规定运输本条目。压力贮器必须符合 4.1.4.1 中的包装指南 P200 的要求，试验耐压能力乘积不得超过 15.2 兆帕·升（152 巴·升）。压力贮器不得与其他危险货物包装在一起。~~

DGP/29-WP/2 号文件第 4.1.2.1.4 段：

《联合国规章范本》第 3.3 章，SP 407（见 ST/SG/AC.10/50/Add.1）：

- A232 (407) 灭火剂散布装置是含有烟火物质的物品，其目的是在启动时散布灭火剂（或气溶胶），并且不含有任何其他危险物品。经包装后交运的这些物品，按照《试验和标准手册》第 I 部分第 16 节试验系列 6 c) 进行试验时，必须符合 1.4S 项的标准。这种装置在运输时必须拆除启动装置或配备至少两个独立的防止意外启动的装置。

灭火剂散布装置只有在满足下列附加条件时才能划入第 9 类，UN 3559：

- a) 该装置符合 2.1.5.2.4 b)、c) 和 d) 中的排除标准；
- b) 根据国际或地区标准（如 NFPA 2010），灭火剂须被视为对正常占用的空间是安全的；
- c) 物品的包装方式必须使其在启动时包装件外部的温度不超过 200 °C；

本条目只有在制造国主管当局批准的情况下方可使用。

本条目不适用于特殊规定 A115 所述的 UN 3268 “电启动安全装置”。

本细则 UN

《联合国规章范本》第 3.3 章，SP 408（见 ST/SG/AC.10/50/Add.1）：

A233 (408) 本条目仅适用于由水、氢氧化四甲铵（TMAH）和不超过 1% 的其他成分组成的水溶液。含有氢氧化四甲铵的其他制剂必须划为适当的通用名或未另作规定的（N.O.S.）条目（例如，UN 2927，有机毒性液体，腐蚀性，未另作规定的，等等），但以下情况除外：

- a) 表面活性剂浓度>1%且氢氧化四甲铵含量不低于 8.75%的其他制剂必须划入 UN 2927，有机毒性液体，腐蚀性，未另作规定的，I 级包装；和
- b) 表面活性剂浓度>1%且氢氧化四甲铵含量大于 2.38%但小于 8.75%的其他制剂必须划入 UN 2927，有机毒性液体，腐蚀性，未另作规定的，II 级包装。

《联合国规章范本》第 3.3 章，SP 409（见 ST/SG/AC.10/50/Add.1）和
DGP/29-WP/3 号文件第 4.1.2.1.4.1 f) 段：

A234 (409) 关于本细则 2023-2024 年版表 3-1 所述的规定，可继续适用至 2026 年 12 月 31 日。

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第 4 部分

包装说明

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第 1 章

一般包装要求

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1.1.3 相容性要求

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为便于运输或国家监督的修订

DGP/29-WP/2 号文件第 4.3.6 段:

1.1.6 盛装液体是包装的一个基本功能，它必须能够承受以下两种压力中较大的压力而不泄漏：内部产生的不低于 95 kPa（对于第 3 类、或 6.1 项或第 9 类 III 级包装的液体，不低于 75 kPa）的压力差，或者与内装液体蒸气压有关的压力。这个与蒸气压有关的压力必须按下列方法之一确定：

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第 4 章

第 2 类 — 气体

4.1 第 2 类危险物品的特殊包装规定

4.1.1 一般要求

4.1.1.1 本部分提出了第 2 类气体（例如 UN 1072 **Oxygen, compressed**（压缩氧气））运输中气瓶和密闭式低温容器使用的一般要求。气瓶和密闭式低温容器的构造和密封必须保证在正常运输条件下，包括振动、温度变化、湿度变化或压力变化（例如由高度引起），无气体漏失。

为与联合国协调一致的修订

DGP/29-WP/3 号文件第 4.1.2.1.5 段:

联合国规章范本，第 4.1 章，4.1.6.1.2（参见 ST/SG/AC.10/50/Add.1）

4.1.1.2 气瓶和密闭式低温容器直接与危险物品接触的部位不得受危险物品影响或被削弱，并且不得引起危险性反应（例如对危险物品起催化作用或与危险物品反应）。必须优先满足有关包装说明当中规定的要求，此外还必须符合 ISO ~~11114-1:2012~~ ~~+A1:2017~~ 11114-1:2020 和 ISO ~~11114-2:2013~~ 11114-2:2021 中的相应规定。

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联合国规章范本，第 4.1 章，4.1.6.1.8（参见 ST/SG/AC.10/50/Add.1）

4.1.1.8 阀门的设计和构造必须使其本身耐损而不会释放内装的气体，或者必须采取如下方法之一，防止阀门损坏，造成气瓶和密闭式低温容器内气体意外释放：

- a) 阀门位于气瓶和密闭式低温容器颈部内，有螺栓或护帽保护；
- b) 用护帽或防护装置保护阀门。护帽必须有足够横截面积的排气孔，以便在阀门发生泄漏时排气；
- c) 阀门可用护罩或防护装置耐久保护性附加装置保护；
- d) 未用过；或
- e) 气瓶和密闭式低温容器装入外包装中运输。该外包装必须达到 6.4.3 规定的 I 级包装性能水平跌落试验的要求。

装有 b) 和 e) 中描述的阀门的气瓶和密闭式低温容器，必须符合 ISO 11117:1998、ISO 11117:2008 + Cor 1:2009 或 ISO 11117:2019 的要求。对 c) 项下用于保护阀门的护罩和耐久保护性附加装置的要求载于相关压力容器外壳设计标准，参见 6.5.2.1。用于可再充装气瓶的本身具有保护装置的阀门，必须符合 ISO 10297:2006 附件 A 第 4.6.2 款，或 ISO 10297:2014 附件 A 第 5.5.2 款或 ISO 10297:2014 + Amd1:2017 附件 A 第 5.5.2 款的要求，或者在自闭阀的情况下，必须符合 ISO 17879:2017 第 5.4.2 款的要求。对于用于不可再充装气瓶的装有带本身具有保护装置的自闭阀的气瓶和密闭式低温容器阀门，必须符合 ISO 17879:2017 ISO 11118:2015 附件 A 第 9.2.5 款或 ISO 11118:2015 + Amd 1:2019 第 9.2.5 款的要求。金属氢贮存系统的阀门则必须符合 ISO 16111:2008 或 ISO 16111:2018 规定的阀门保护要求。

本报告第 2.2.4 段：

4.1.1.9 不可再充装的气瓶和密闭式低温容器必须：

- a) 在外包装内运输，例如箱子、板条箱、收缩性薄膜缠绕的托盘、拉伸性薄膜缠绕的托盘；
- b) 装满易燃气体时水容量小于或等于 1.25 升；
- b) 气瓶投入使用后不得修理。

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4.2 包装说明

包装说明 200

气瓶必须符合 4;1.1 和 4;4.1.1 的一般包装要求。

按第 6;5 规定制造的气瓶准予运输下面表（表 1 和表 2）中所规定的具体物质。如果气瓶的设计、制造、试验、批准和标记符合批准和充装气瓶的国家有关当局的要求，这种非联合国标记和规格的气瓶可以使用。内装物质必须是按照本细则规定允许盛装于气瓶和允许进行空运的。定期试验到期的气瓶要等到成功地通过了再试验才可充装和交付运输。阀门必须得到适当的保护或按照 ISO 10297:1999 附件 B 的规定设计和制造得耐损而不泄漏。容量为 1L 或更小的气瓶必须盛放在外包装内并进行固定或衬垫，以防止在正常运输条件下容器在外包装内明显移动。该外包装应使用适当材料，其强度和设计应考虑到包装的容量和用途。对于某些物质，特殊包装规定可能禁止某种气瓶的使用。必须符合下列要求：

 联合国规章范本，第 4.1 章，4.1.4.1，P200（4）（参见 ST/SG/AC.10/50/Add.1）

5) 气瓶必须由合格人员使用适当的设备和程序来充装。程序应包括检查：

- a) 气瓶和配件是否符合本细则；
- b) 气瓶是否与所运产品相匹配；
- c) 不存在可能影响安全的损坏；
- d) 酌情检查是否满足充装度或充装压力要求；
- e) 标记和识别标志。

如果适用以下标准，可认为上述要求得以满足：

ISO 10691:2004 气瓶 — 用于液化石油气（LPG）的可再充装焊接钢瓶 — 充装前后及充装期间的检查程序
 ISO 11372:2011 气瓶 — 乙炔气瓶 — 充装条件和充装检查
 ISO 11755:2005 气瓶 — 用于压缩气体和液化气体（乙炔除外）的气瓶组 — 充装时检查
 ISO 13088:2011+AMD. 1: 2020 气瓶 — 乙炔气瓶组 — 充装条件和充装检查
 ISO 24431:2016 气瓶 — 用于压缩气体和液化气体（乙炔除外）的无缝、焊接和复合气瓶 — 充装时检查

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6) “特殊包装规定”：

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气体具体规定：

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 联合国规章范本，第 4.1 章，4.1.4.1，P200（5）（参见 ST/SG/AC.10/50/Add.1）

s) 铝合金气瓶必须是：

- a) 只装配黄铜或不锈钢阀门；
- b) 按照 ISO 11621:1997 进行清洗且不沾染油。

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表 2 液化气体和溶解气体

UN 编号	名称	类或项	次要危险性	LC ₅₀ ml/m ³	气瓶	试验周期年	试验压力巴	充装比	特殊包装规定
1001	Acetylene, dissolved 溶解乙炔	2.1			X	10	60 52		c, p
1009	Bromotrifluoromethane (refrigerant gas R 13b1) 溴三氟甲烷 (制冷气体 R 13b1)	2.2			X	10	42 120 250	1.13 1.44 1.60	
1010	Butadienes, stabilized (1,2-butadiene) 丁二烯，稳定化的 (1,2-丁二烯)	2.1			X	10	10	0.59	
1010	Butadienes, stabilized (1,3-butadiene) 丁二烯，稳定化的 (1,3-丁二烯)	2.1			X	10	10	0.55	z

UN 编号	名称	类 或项	次要 危险性	LC ₅₀ ml/m ³	气瓶	试验 周期年	试验 压力巴	充装比	特殊包装 规定
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联合国规章范本，第 4.1 章，4.1.4.1，P200 表 2（参见 ST/SG/AC.10/50/Add.1）

1010	Butadienes and hydrocarbon mixture, stabilized containing more than 40% 20% butadienes 丁二烯和碳氢化合物混合物，稳定化的，含丁二烯超过 40% 20%	2.1			X	10			v z
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包装说明 202

本条说明适用于装在开放式和密封式低温容器内的第 2 类冷冻液化气体。

对密闭式低温容器的要求

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联合国规章范本，第 4.1 章，4.1.4.1，P203（5）（参见 ST/SG/AC.10/50/Add.1）

5) 填装程度

对于非易燃、非毒性的冷冻液化气体而言，其在装载温度和 100 千帕（1 巴）压力下的液态体积，不得超过压力容器容量的 98%。

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对开放式低温容器的要求

开放式低温容器的制造必须满足以下要求：

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联合国规章范本，第 4.1 章，4.1.4.1，P203（9）（参见 ST/SG/AC.10/50/Add.1）

9. 开放式低温容器必须带有以下永久性标记，如印戳、镌刻或蚀刻：

- a) 制造商名称和地址；
- b) 型号或名称；
- c) 序列号或批号；
- d) 容器准备盛装气体的联合国编号和运输专用名称；
- e) 以升表示的容器容量。

注：标记的尺寸必须符合 6.5.2.7.1 的气瓶要求。2012 年 1 月 1 日之前制造的开放式低温容器不须作出此种标记。

10. 准许使用开放式低温容器来盛装冷冻液态氮、氩、氦、氖和氙。

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包装说明 218

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补充包装要求

- a) 气瓶的充装，要求在 50℃ 时非气相部分不得超过气瓶水容量的 95%，在 60℃ 时不得全部充满。气瓶充装后，在 65℃ 条件下的内部压力不得超过气瓶的试验压力。气瓶内的所有物质的蒸汽压和体积膨胀均应考虑在内。
- b) 在运输过程中，不得连接喷洒设备（例如软管和杆的组件）。
- c) 推动剂的最低试验压力必须符合包装说明 200，但不得低于 20 巴（bar）。

联合国规章范本，第 4.1 章，4.1.4.1，P206（PP89）（4）（参见 ST/SG/AC.10/50/Add.1）

- d) 使用的不可再充装气瓶，其水容量以升表示，不得超过 1 000 升除以试验压力（巴）之商，但制造标准的容量和压力限制必须符合 ISO 11118:1999~~2015~~ + Amd 1:2019 第 1 款，该标准的限制为最大容量 50 升。
- e) 对于充装了压缩气体的液体，在计算气瓶的内压时，必须将两个部分 — 液体和压缩气体都考虑在内。在不可获取试验数据时，必须采取以下步骤：
 - i) 计算 15℃ 度（充装温度）时液体的蒸汽压力和压缩气体的分压；
 - ii) 计算从 15℃ 加热到 65℃ 所引起的液相的体膨胀，并计算剩余的气相体积；
 - iii) 在对液相的体膨胀做出考虑的情况下，计算 65℃ 时压缩气体的分压；
注：必须考虑 15℃ 和 65℃ 时压缩气体的压缩因数。
 - iv) 计算 65℃ 度时液体的蒸汽压力；
 - v) 总压力是 65℃ 时液体的蒸汽压力和压缩气体的分压之和；
 - vi) 考虑 65℃ 时压缩气体在液相中的溶解度。

气瓶的试验压力不得低于计算得到的总压力减 100 千帕（1 巴）。

如果计算时不知道压缩气体在液相中的溶解度，计算试验压力时可不考虑气体的溶解度（第 vi）项）。

- f) 对于划为 UN 3500 的灭火剂，定期检查的最长试验间隔必须为 10 年。

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包装说明 220

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电池

所有电池都必须牢固地安装和固定在机器或设备的电池盒中，并采取保护措施防止损坏和短路。此外：

为便于管理航空特有风险的修订

DGP/29-WP/2 号文件第 4.2.2.3 段：

- 1) 如果安装的是非防漏型电池，并且机器或设备有可能被置于一种使电池无法保持其原有朝向的状态时，则必须将电池拆下，并酌情按照包装说明 ~~492~~或-870 进行包装。
- 2) 如果安装的是锂电池：
 - i) 禁止运输按照特殊规定 A154 查明为已经受损或具有缺陷的锂电池；和
 - ii) 锂电池必须满足 2.9.3 的规定，但是出于试验目的予以运输的生产之前的锂电池或电池芯原型或低产量的锂电池或电池芯，没有按联合国《试验和标准手册》的第 III 部分 38.3 节的要求进行过测试的，如果经始发国和运营人所属国有关当局的批准，可以在货机上运输。托运货物必须随附一份批准文件。
- 3) 如果安装的是钠金属或钠合金电池，它们必须符合特殊规定 A94 的要求。

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第 5 章

第 3 类 — 易燃液体

为与联合国协调一致的修订

DGP/29-WP/3 号文件第 4.1.2.1.5 段：

包装说明 372

仅限于 UN 3165 的仅限货机运输

联合国规章范本，第 4.1 章，4.1.4.1，P301（参见 ST/SG/AC.10/50/Add.1）

一般要求

必须符合第 4;1.1.1、4;1.1.5、4;1.1.8 和 4;1.1.10 部分 ~~第 4 章~~ 的要求，~~其中包括：~~

1) 相容性要求

— 物质必须按照 4;1.1.3 的要求与其包装相容。

~~2) 封闭要求~~

~~— 封闭必须符合 4;1.1.4 的要求。~~

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包装说明 378

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电池

所有电池都必须牢固地安装和固定在机器或设备的电池盒中，并采取保护措施防止损坏和短路。此外：

为便于管理航空特有风险的修订

DGP/29-WP/2 号文件第 4.2.2.3 段：

- 1) 如果安装的是非防漏型电池，并且机器或设备有可能被置于一种使电池无法保持其原有朝向的状态时，则必须将电池拆下，并酌情按照包装说明 ~~492~~或 870 进行包装。
- 2) 如果安装的是锂电池：
 - i) 禁止运输按照特殊规定 A154 查明为已经受损或具有缺陷的锂电池；和
 - ii) 锂电池必须满足 2;9.3 的规定，但是出于试验目的予以运输的生产之前的锂电池或电池芯原型或低产量的锂电池或电池芯，没有按联合国《试验和标准手册》的第 III 部分 38.3 节的要求进行过测试的，如果经始发国和运营人所属国有关当局的批准，可以在货机上运输。托运货物必须随附一份批准文件。
- 3) 如果安装的是钠金属或钠合金电池，它们必须符合特殊规定 A94 的要求。

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第 6 章

第 4 类 — 易燃固体；易于自燃的物质；
遇水放出易燃气体的物质

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为与联合国协调一致的修订

DGP/29-WP/2 号文件第 4.1.2.1 段：

包装说明 451					
客机和货机运输 — 湿爆炸物 (I 级包装)					
.....					
组合包装					单一包装
联合国编号和运输专用名称	内包装 (见 6.3.2)	(每个容器) 内包装数量	每个包装件 总量 — 客机	每个包装件 总量 — 货机	
UN 3474 1-Hydroxybenzotriazole, anhydrous, wetted monohydrate 一水无水羟基苯丙三唑, 湿的	玻璃 塑料	0.5 kg	0.5 kg	0.5 kg	否
.....					

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DGP/29-WP/3 号文件第 4.1.2.1.5 段：

包装说明 492

仅限于 UN 3292 的客机和货机运输

一般要求

必须符合第 4 部分第 1 章的要求，其中包括：

1) 相容性要求

- 物质必须按照 4;1.1.3 的要求与其包装相容。
- 金属包装必须抗腐蚀或有防腐措施。

2) 封闭要求

- 封闭必须符合 4;1.1.4 的要求。

联合国规章范本，第 3.2 章，危险货物一览表（参见 ST/SG/AC.10/50/Add.1）：

联合国编号和运输专用名称	包装条件	每个包装件 总量 — 客机	每个包装件 总量 — 货机
UN 3292 Batteries, containing metallic sodium or sodium alloy 含钠金属或钠合金电 池	电池可以无包装或放在不受本细则第 6 部分要求限制的保护性外壳（例如完全封闭的或木条制的板条箱）中交运和运输。	禁运	无限制
UN 3292 Cells, containing metallic sodium or sodium alloy 含钠金属或钠合金电 池芯	必须有足够的衬垫材料，以防止电池芯之间以及电池芯与外包装内表面之间相互接触，并确保在运输时电池芯不会在外包装内发生危险移动。	25 kg	400 kg

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第 8 章

第 6 类 — 毒性和感染性物质

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为与联合国协调一致的修订

DGP/29-WP/3 号文件第 4.1.2.1.5.1 段:

包装说明 650

此包装说明适用于 UN 3373。

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联合国规章范本, 第 4.1 章, 4.1.4.1, P650 (6) (参见 ST/SG/AC.10/50/Add.1)

- 6) 完成的包装件必须能成功通过本细则 6:6.5.2 规定的 6:6.5.3 中的跌落试验, 但跌落高度不得低于 1.2 m。在按照适当的跌落顺序进行跌落试验后, 在任何方向上承受 1.2 米高的跌落, 而主容器不得有任何泄漏, 主容器必须始终放在辅助包装内并根据需要用吸附材料保护。

注: 可通过试验、评估或经验证明承受力。

- 7) 装液态物质:

- a) 主容器必须防泄漏, 内装量不得超过 1 L;
- b) 辅助包装必须防泄漏;
- c) 多个易碎的主容器装入一个单一的辅助包装时, 必须将它们分别包裹或隔离, 以便防止它们彼此接触;
- d) 必须在主容器和辅助包装之间填充吸附材料。吸附材料必须数量充足, 能够吸收主容器中的所有内装物, 从而使液态物质的任何泄漏都不会破坏衬垫材料或外包装的完好性;
- e) 主容器或辅助包装必须能承受 95 kPa (0.95 bar) 的内部压力而无泄漏; 和

联合国规章范本, 第 4.1 章, 4.1.4.1, P650 (7) (参见 ST/SG/AC.10/50/Add.1)

和 DGP/29-WP/3 号文件第 4.1.2.1.5.1 段:

注: 应该通过对主容器或辅助包装的样品进行试验, 来确定包装能够承受产生规定压差的内部压力而不泄漏的能力。压差是对容器或包装内部和外部所施加的压力之间的差异。应该根据容器或包装类型来选择适当的试验方法。可接受的试验方法包括任何一种能够在主容器或辅助包装的内部和外部之间产生所需压差的方法。可以使用内部液压或气压 (表压) 或外部真空试验方法来进行试验。在绝大多数情况下都可采用内部液压或气压, 这是因为在绝大多数情况下都可达到所需压差。外部真空试验如果不能达到并保持规定压差, 则不可采用。外部真空试验对于刚性容器和包装而言通常是一种可接受的方法, 但是通常不可用于:

— 软性容器和软性包装;

— 在低于 95 kPa 的绝对大气压力下填充和封闭的容器和包装。

- f) 外包装的内装量不得超过 4L。当冰、干冰或液氮用于使样品保持低温时，此内装量不包括它们的数量。

~~注：应该通过对主容器或辅助包装的样品进行试验，来确定包装能够承受产生规定压差的内部压力而不泄漏的能力。压差是对容器或包装内部和外部所施加的压力之间的差异。应该根据容器或包装类型来选择适当的试验方法。可接受的试验方法包括任何一种能够在主容器或辅助包装的内部和外部之间产生所需压差的方法。可以使用内部液压或气压（表压）或外部真空试验方法来进行试验。在绝大多数情况下都可采用内部液压或气压，这是因为在绝大多数情况下都可达到所需压差。外部真空试验如果不能达到并保持规定压差，则不可采用。外部真空试验对于刚性容器和包装而言通常是一种可接受的方法，但是通常不可用于：~~

~~——软性容器和软性包装；~~

~~——在低于 95 kPa 的绝对大气压力下填充和封闭的容器和包装。~~

- 8) 装固态物质：

- a) 主容器必须防筛漏，不得超过外包装的质量限制；
- b) 辅助包装必须防筛漏；
- c) 多个易碎的主容器装入一个单一的辅助包装时，必须将它们分别包裹或隔离，以便防止它们彼此接触；
- d) 装有肢体、器官和整个躯体的包装件除外，外包装的内装量不得超过 4 kg。当冰、干冰或液氮用于使样品保持低温时，此内装量不包括它们的数量；和
- e) 如果对运输过程中主容器内是否存有残留液体有任何疑问，必须使用适于装运液体的包装，包括吸附材料。

- 9) 冷藏或冷冻的样品：冰、干冰或液氮：

- a) 当干冰或液氮用于使样品保持低温时，必须满足本细则的所有适用要求。使用时，必须将冰或干冰置于辅助包装的外面或置于外包装或合成包装件的里面。必须提供内部支撑，以便保证在冰或干冰消融以后辅助包装仍位于原来的位置。如果使用冰，外包装或合成包装件必须防漏。如果使用固态二氧化碳（干冰），包装的设计和构造必须做到能排出二氧化碳，以便防止产生有可能使包装破裂的压力；和
- b) 在使用制冷剂的温度下，以及在失去制冷作用的情况下可能产生的温度和压力下，主容器和辅助包装必须保持其完好性。

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- 10) 当把包装件装入一个合成包装件中时，本包装说明所要求作出的包装件标记必须是清晰可见的，或者必须将标记重新标在合成包装件的外面，并且必须在合成包装件上标有字高应至少为 12 毫米的“Overpack（合成包装件）”的字样。

为便于运输或国家监督的修订

本报告第 3.4 段：

- 11) 按照本包装说明进行包装并作出标记的划入 UN 3373 的感染性物质不受本细则中的任何其他要求的限制，但必须遵守下列要求：
 - a) 必须在每个包装件上写明托运人和收货人的姓名和地址。可通过使用条形码、QR 码或其他等效手段提供这些信息；

- b) 必须提供一份有关负责人的姓名和电话号码的书面文件（例如一份航空货运单），或者将这些信息标写在包装件上；
- c) 必须按照 2;6.3.2 进行分类；
- d) 必须符合 7;4.4 和 7; 4.5 中所述的事事故征候报告要求；

注：当托运人或收货人也是 b) 所指的“负责人”时，只需要标明一次其姓名和地址，以满足 a) 和 b) 关于姓名和标记的规定。

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第 10 章

第 8 类 — 腐蚀性物质

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包装说明 866

仅限于 UN 2028 的仅限货机运输

一般要求

必须符合第 4 部分第 1 章的要求，其中包括：

1) 相容性要求

- 物质必须按照 4; 1.1.3 的要求与其包装相容。
- 金属包装必须抗腐蚀或有防腐措施。

2) 封闭要求

- 封闭必须符合 4; 1.1.4 的要求。

组合包装				单一包装
联合国编号和运输专用名称	包装条件	每个包装件 总量 — 客机	每个包装件 总量 — 货机	
UN 2028 Bombs, smoke, non-explosive with corrosive liquid, without initiating device 烟幕弹，非爆炸性，含腐蚀性液体，不带引爆装置	可以运输无点火器、无炸药、无雷管或其他爆炸器件的烟雾弹。	禁运	50 kg	否

为与联合国协调一致的修订

联合国规章范本，第 4.1 章，4.1.4.1, P803 (7) (参见 ST/SG/AC.10/50/Add.1)

组合包装的补充包装要求

- 包装必须符合 II 级包装的性能要求。
- 物品必须个别地包装并用隔层、分隔板、内包装或衬垫材料互相隔开。

组合包装的外包装 (见 6; 3.1)

箱

铝 (4B)
纤维板 (4G)
天然木 (4C1, 4C2)
其他金属 (4N)
塑料 (4H1, 4H2)
胶合板 (4D)
再生木 (4F)
钢 (4A)

桶

铝 (1B2)
纤维 (1G)
其他金属 (1N2)
塑料 (1H2)
钢 (1A2)

为与联合国协调一致的修订

联合国规章范本，第 4.1 章，4.1.4.1，P003（参见 ST/SG/AC.10/50/Add.1）

包装说明 869

仅限于 UN 3506 和 UN 3554 的客机和货机运输

一般要求

必须符合第 4 部分第 1 章的要求，其中包括：

1) 相容性要求

- 物质必须按照 4; 1.1.3 的要求与其包装相容。
- 金属包装必须抗腐蚀或有防腐措施。

2) 封闭要求

- 封闭必须符合 4; 1.1.4 的要求。

组合包装			单一包装
联合国编号和运输专用名称	每个包装件净量* — 客机	每个包装件净量* — 货机	
UN 3506 Mercury contained in manufactured articles 包含在制品中的汞	无限制	无限制	否
UN 3554 Gallium contained in manufactured articles 包含在制品中的镓			

* 为 5; 4.1.5.1 之目的，危险物品运输文件所示的“净量”系指每个包装件内的制品的净质量。

补充包装要求

- 金属汞或镓作为一个组成部分的制品或仪器，如气压计、泵、温度计、开关等，在放入外包装之前必须酌情装在由不受汞或镓影响的防渗漏和耐穿透材料制成的密封内衬或袋子当中，不管包装件如何放置，汞或镓都不会从包装件中泄漏。

注：如果汞开关和继电器是密封金属或塑料组件内的全封闭防漏型，可以不要求配置密封的内衬或袋子。

- 电子管、水银蒸气管（所含汞的总净量不超过 450 g）必须装入坚固的外包装内，而外包装的所有接缝和闭合处都用胶粘带或压敏胶带封住，以防止汞从包装件中渗漏。

注：含汞超过 450 g 的管必须按照（上述）制品或仪器的要求进行包装。

- 装入密封防漏金属包壳的电子管可以使用制造商的原包装予以运输。

组合包装的外包装（见 6;3.1）

箱

桶

方桶

坚固的外包装

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第 11 章

第 9 类 — 杂项危险物品

包装说明 950

电池

所有电池都必须牢固地安装和固定在车辆的电池盒中，并采取保护措施防止损坏和短路。此外：

为便于管理航空特有风险的修订

DGP/29-WP/2 号文件第 4.2.2.3 段：

- 1) 如果安装的是非防漏型电池，并且车辆有可能被置于一种使电池无法保持其原有朝向的状态时，则必须将电池拆下，并酌情按照包装说明 ~~492~~或 870 进行包装。
- 2) 如果安装的是锂电池：
 - i) 禁止运输按照特殊规定 A154 查明为已经受损或具有缺陷的锂电池；和
 - ii) 锂电池必须满足 2.9.3 部分的规定，但是出于试验目的予以运输的生产之前的锂电池或电池芯原型或低产量的锂电池或电池芯，没有按联合国《试验和标准手册》的第 III 部分 38.3 节的要求进行过测试的，如果经始发国和运营人所属国有关当局的批准，可以在货机上运输。托运货物必须随附一份批准文件。

见本报告第 1.2.1.4.1 a) 段：

- 3) 如果安装的是钠金属或钠合金电池，它们必须符合特殊规定 A94 的要求。

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包装说明 951

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电池

所有电池都必须牢固地安装和固定在车辆的电池盒中，并采取保护措施防止损坏和短路。此外：

为便于管理航空特有风险的修订

参见 DGP/29-WP/2 号文件第 4.2.2.3 段：

- 1) 如果安装的是非防漏型电池，并且车辆有可能被置于一种使电池无法保持其原有朝向的状态时，则必须将电池拆下，并酌情按照包装说明 ~~492~~或 870 进行包装。
- 2) 如果安装的是锂电池：
 - i) 禁止运输按照特殊规定 A154 查明为已经受损或具有缺陷的锂电池；和
 - ii) 锂电池必须满足 2.9.3 部分的规定，但是出于试验目的予以运输的生产之前的锂电池或电池芯原型或低产量的锂电池或电池芯，没有按联合国《试验和标准手册》的第 III 部分 38.3 节的要求进行过测试的，如果经始发国和运营人所属国有关当局的批准，可以在货机上运输。托运货物必须随附一份批准文件。
- 3) 如果安装的是钠金属或钠合金电池，它们必须符合特殊规定 A94 的要求。

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为便于管理航空特有风险的修订

和

对电池规定的修订

和

为与联合国协调一致的修订

DGP/29-WP/2 号文件第 4.2.2.3 段和 DGP/29-WP/3 号文件第 4.1.2.1.5 段：

包装说明 952

联合国规章范本，第 3.2 章，危险货物一览表（参见 ST/SG/AC.10/50/Add.1）：

仅限于 UN 3171、UN 3556、UN 3557、UN 3558 的客机和货机运输

（参见包装说明 220 — 以易燃气体为燃料的发动机和机器，

包装说明 378 — 以易燃液体为燃料的发动机和机器，包装说明 950 — 以易燃液体为燃料的车辆，

包装说明 951 — 以易燃气体为燃料的车辆，或包装说明 972 — 仅包含对环境有害燃料的发动机或机器）

一般要求

必须符合第 4 部分第 1 章的要求，其中包括：

1) 相容性要求

— 物质必须按照 4:1.1.3 的要求与其包装相容。

2) 封闭要求

— 封闭必须符合 4:1.1.4 的要求。

联合国编号和运输专用名称	客机数量	货机数量
UN 3171- Battery-powered equipment or Battery-powered vehicle 以电池为动力的设备或以电池为动力的车辆	无限制	无限制
UN 3556 Vehicle, lithium ion battery powered 以锂离子电池为动力的车辆		
UN 3557 Vehicle, lithium metal battery powered 以锂金属电池为动力的车辆		
UN 3558 Vehicle, sodium ion battery powered 以钠离子电池为动力的车辆		

DGP/29-WP/2 号文件（参见第 4.2.2.3 段）和联合国规章范本第 3.2 章，危险货物一览表（参见 ST/SG/AC.10/50/Add.1）及本报告第 1.2.1.4 c) 段和第 2.2.7 段：

补充包装要求

本条目适用于以湿电池、钠金属或钠合金电池或锂电池为动力的车辆和设备，包括机械，也适用于以锂电池或钠离子电池为动力的车辆，并且在运输时这些电池是安装在这些车辆和设备上的。例如，此类车辆和设备的例子包括电动的车、割草机、轮椅及其他移动辅助设备。车辆如果也装有内燃机，必须酌情划入 UN 3166 Vehicle

(flammable gas powered) (易燃气体为动力的车辆) (参见包装说明 951) 或 Vehicle (flammable liquid powered) (易燃液体为动力的车辆) (参见包装说明 950)。

若车辆或设备在操作过程中不能保持直立, 则必须将车辆或设备严密封装于下类坚实牢固的外包装中。必须将车辆或设备在外包装中**束缚牢固, 使车辆保持固定**固定束缚, 以免在运输期间发生移动, 从而改变朝向或给车辆或设备造成损坏。

车辆和设备必须配备防止意外启动的有效装置。

电池驱动的车辆、~~机器~~或设备必须满足下列要求:

电池

所有电池都必须牢固地安装和固定在车辆、~~机器~~或设备的电池盒中, 并采取保护措施防止损坏和短路。此外:

- 1) 如果安装的是非防漏型电池, 并且车辆、~~机器~~或设备有可能被置于一种使电池无法保持其原有朝向的状态时, 则必须将电池拆下, 并**酌情**按照包装说明 **492 或 870** 进行包装。
- 2) 如果安装的是锂电池或钠离子电池:
 - i) 禁止运输按照特殊规定 A154 查明为已经受损或具有缺陷的**锂**电池; **和**

删除 ii) 中的“除非得到始发国有关当局的另行批准, ”, 不适用于西班牙文或法文版的《细则》, 因其内容在西班牙文或法文版中不存在 (见本报告第 4.3 段)

- ii) ~~除非得到始发国有关当局的另行批准,~~锂电池必须满足第 2 部分 9.3 的规定**和**, 钠离子电池必须满足第 2 部分 9.4 的规定, 但是出于试验目的予以运输的生产之前的锂电池或钠离子电池**或电池芯**原型或低产量的锂电池或钠离子电池**或电池芯**, 没有按联合国《试验和标准手册》的第 III 部分 38.3 节的要求进行过测试的, 如果经始发国和运营人所属国有关当局的批准, 可以在货机上运输。托运货物必须随附一份批准文件。
- iii) 若**锂**电池从车辆中拆下, 并与同一外包装中的车辆分开包装, 该包装件必须酌情按照包装说明 966、969 或 977 进行包装, 作为 UN 3481 — 与设备包装在一起的锂离子电池、UN 3552 — 与设备**包装在一起的钠离子电池**或 UN 3091 — 与设备包装在一起的**锂金属**电池**交运**; **和**

参见本报告第 4.2 段:

- iv) 对于 UN 3556 — 以锂离子电池为动力的车辆、UN 3557 — 以锂金属电池为动力的车辆, 当电池可充电时, **和 UN 3558 — 以钠离子电池为动力的车辆:**

1) 至 2025 年 12 月 31 日

车辆交运时应配备:

- 荷电状态不超过其额定容量 30% 的电池; 或
- 指示的电池容量不超过 25%。

2) 自 2026 年 1 月 1 日起

a) 由瓦时额定值超过 100 瓦时的电池为动力的车辆交运时必须配备:

- 荷电状态不超过其额定容量 30% 的电池; 或
- 指示的电池容量不超过 25%。

b) 由瓦时额定值不超过 100 瓦时的电池为动力的车辆交运时应配备:

- 荷电状态不超过其额定容量 30% 的电池; 或

— 指示的电池容量不超过 25%。

- c) 由瓦时额定值超过 100 瓦时且荷电状态超过其额定容量 30%或由指示的电池容量超过 25%的电池为动力的车辆，仅可在始发国和运营人所属国的批准下根据这些国家当局规定的书面条件来运输。

见本报告第 4.1.3.5 段：

注：关于确定额定容量的相关指南和方法，见联合国《试验和标准手册》第 38.3.2.3 小节。在荷电状态降低情况下运输的电池芯和电池不太容易发生热失控。

见 DGP/29-WP/2 号文件（见第 4.2.2.3 段）、联合国规章范本第 3.2 章，危险货物一览表（见 ST/SG/AC.10/50/Add.1）和本报告第 1.2.1.4 c) 段和第 2.2.7 段：

- 3) 如果安装的是钠金属或钠合金电池，它们必须符合特殊规定 A94 的要求。

其他作业设备

- 1) 车辆、~~机器~~或设备运行或安全所需的危险物品，例如灭火器、轮胎充气罐、或安全装置，必须妥善地安装在车辆、~~机器~~或设备中。航空器也可装有本属于危险物品但是按照有关的适航要求和操作规程安装在航空器上的其他物品和物质。如果安装了救生筏、紧急撤离滑道和其他充气装置，必须采取保护措施确保它们不会意外启动。装配有表 3-1 中确认的禁止以客机运输的危险物品的车辆或设备只可以用货机运输。允许运输的危险物品的备件不得按本包装说明进行运输。
- 2) 装有防盗装置、无线电通信设备或导航系统的车辆必须使这些装置、设备或系统处于无法工作状态。

坚固的外包装 — 车辆和设备

箱	桶	方桶
铝	铝	铝
纤维板	纤维	塑料
天然木	其他金	钢
其他金属	塑料	
塑料	胶合板	
胶合板	钢	
再生木		
钢		

为与联合国协调一致的修订

和

对电池规定的修订

DGP/29-WP/3 号文件第 4.1.2.1.5 段：

包装说明 955

仅限于 UN 2990 和 UN 3072 的客机和货机运输

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补充包装要求

救生器材只可以含有如下危险物品：

- a) 2.2 项气体必须装入符合批准和充装气瓶的国家有关当局的要求的气瓶中。此类气瓶可以与救生器材相连。可包括每单元总量不超过 3.2 克爆燃（推进）炸药的启动药筒（药筒，属于 1.4C 和 1.4S 项动力装置）。当气瓶分开运输时，必须酌情按照所含 2.2 项气体进行分类，不需要按爆炸物标记、标签或描述；
- b) 信号装置（第 1 类），可能包括烟雾信号弹和照明信号弹；信号装置必须装入塑料或纤维板内包装；
- c) 少量的易燃物质、腐蚀性固体和有机过氧化物（第 3 类、第 8 类、4.1 项和 5.2 项），可能包括修理工具箱和不超过 30 根的摩擦型火柴。有机过氧化物只可放在修理工具箱内，工具箱必须装入坚固的内包装。摩擦型火柴必须装入带有旋盖的圆柱形金属或复合包装内，并要加以衬垫防止移动；
- d) 必须断开或者电气隔离并采取短路防护措施的蓄电池（第 8 类）；

联合国规章范本，第 3.2 章，危险货物一览表（参见 ST/SG/AC.10/50/Add.1）：

- e) 锂电池和钠离子电池：
 - 1) 如果为按照特殊规定 A154 查明为已经受损或具有缺陷的锂电池，则禁止运输；
 - 2) 必须酌情满足 2:9.3 或 2:9.4 中的适用要求；
 - 3) 必须断开或者电气隔离并采取短路防护措施；和
 - 4) 必须固定好，防止在救生装置内移动。
- f) 可能含有易燃、腐蚀性和毒性物品或物质的急救箱。

救生器材必须装在坚固的外包装内以防意外启动，除了救生筏，危险物品必须置于内包装中，以防移动。所含危险物品必须是救生器材不可缺少的功能构成部分，并且其数量不得超过实际用量。

救生器材也可包括属于器材的组成部分的不受本细则限制的物品和物质。

为与联合国协调一致的修订

DGP/29-WP/3 号文件第 4.1.2.1.5 段：

联合国规章范本，第 3.2 章，危险货物一览表（参见 ST/SG/AC.10/50/Add.1）：

包装说明 961

仅限于 UN 3268 和 UN 3559 的客机和货机运输

一般要求

必须符合第 4 部分第 1 章的要求，其中包括：

1) **相容性要求**

— 物质必须按照 4;1.1.3 的要求与其包装相容。

2) **封闭要求**

— 封闭必须符合 4;1.1.4 的要求。

联合国编号和运输专用名称	客机数量	货机数量	单一包装
UN 3268 Safety devices, electrically initiated 电启动安全装置	25 kg	100 kg	否
UN 3559 Fire suppressant dispersing devices 灭火剂散布装置			

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包装说明 964

仅限于 UN 1941, UN 1990, UN 2315, UN 3151, UN 3082 和 UN 3334 的客机和货机运输

为便于管理航空特有风险的修订

DGP/29-WP/2 号文件第 4.2.2.2 段：

一般要求

必须符合第 4 部分第 1 章的要求（但包装在组合包装中的 UN 3082 不适用 4;1.1.6 的要求）。

这些要求包括：

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为与联合国协调一致的修订

和

对电池规定的修订

包装说明 965

仅限货机运输 UN 3480

1. 引言

本条目适用于锂离子或锂聚合物电池。本包装说明的结构如下：

- 1A 节适用于瓦时额定值超过 20 Wh 的锂离子电池芯和瓦时额定值超过 100 Wh 的锂离子电池，这些电池芯和电池必须划入第 9 类并须受本细则所有有关要求的限制；和
- 1B 节适用于瓦时额定值不超过 20 Wh 的锂离子电池芯和瓦时额定值不超过 100 Wh 的锂离子电池。

联合国《试验和标准手册》第三部分 38.3.2.3 小节中定义的一个单电池芯电池被视为一个“电池芯”，必须根据本包装说明中针对“电池芯”的要求加以运输。

DGP/29-WP/3 号文件第 4.1.2.1.5.2.5 段和 本报告第 1.2.1.4 b) 段：

2. 禁止运输的锂电池

以下规定适用于本包装说明内所有锂电池芯和电池：

禁止运输按照特殊规定 A154 查明为已经受损或具有缺陷的电池芯或电池。

除非得到始发国和运营人所属国的国家有关当局批准，禁止航空运输废弃锂电池芯或电池，以及为回收或处置目的运输的锂电池芯或电池。

IA 第 IA 节

每个电池芯或电池必须满足 2.9.3 的规定。

IA.1 一般要求

- 必须符合 4.1 的要求。
- 锂电池芯和电池必须在荷电状态不超过其额定容量 30% 的情况下交运。电池芯和/或电池在荷电状态大于其额定容量 30% 的情况下，仅可在始发国和运营人所属国的批准下根据这些国家当局规定的书面条件来运输。

本报告第 4.1.3.5 段：

注：关于确定额定容量的相关指南和方法，见联合国《试验和标准手册》的 38.3.2.3 小节。荷电状态降低的情况下运输的电池芯和电池不太容易发生热失控。

表 965-IA

联合国编号和运输专用名称	每个包装件净数量	
	客机	货机
UN 3480 Lithium ion batteries 锂离子电池	禁运	35 kg

包装说明 965

DGP/29-WP/3 号报告第 4.1.2.1.5.2.5 段:

IA.2 补充要求

- 必须保护锂离子电池芯和电池免于短路。
- 锂离子电池芯和电池必须放入能将电池芯或电池完全封装的内包装内，然后再放入外包装。电池芯或电池的完成包装件必须满足 II 级包装的性能要求。
- 锂离子电池芯和电池不得与第 1 类物质和物品（爆炸物）一起放入同一外包装件内，1.4S 项、2.1 项（易燃气体）、第 3 类（易燃液体）、4.1 项（易燃固体）或 5.1 项（氧化性物质）除外。
- 经始发国有关当局批准，质量超过 12 kg 且具有耐冲撞坚固外壳的锂离子电池芯或电池，可以放在不受本细则第 6 部分要求限制的坚固外包装或保护封罩中（如完全封闭的箱子或木制板条箱）进行运输。批准文件必须随附托运货物。
- 2011 年 12 月 31 日之后生产的电池必须在外壳上标明瓦时额定值。

IA.3 外包装

箱	桶	方桶
铝（4B）	铝（1B2）	铝（3B2）
纤维板（4G）	纤维（1G）	塑料（3H2）
天然木（4C1, 4C2）	其他金属（1N2）	钢（3A2）
其他金属（4N）	塑料（1H2）	
塑料（4H1, 4H2）	胶合板（1D）	
胶合板（4D）	钢（1A2）	
再生木（4F）		
钢（4A）		

IB. 第 IB 节

根据本节包装的锂离子电池芯或电池须受本细则所有有关规定的限制（包括本包装说明第 2 段和本节要求在內），但第 6 部分的规定除外。

必须根据第 IB 节的规定，在 5.4 部分的危险物品运输文件上说明所托运的锂离子电池芯或锂离子电池。必须在 5.4.1 和 5.8.1a) 部分所规定的包装说明号码“965”之后加上“IB”字样。5.4 部分所有其他适用的规定均应适用。

可以交运锂离子电池芯和电池，条件是每个电池芯和电池都满足 2.9.3 a)、e) 和 g) 的规定以及以下条件：

- 1) 锂离子电池芯的瓦时额定值（见附录 2 的术语汇编）不超过 20Wh；
- 2) 锂离子电池的瓦时额定值不超过 100 Wh；
 - 必须在电池盒外壳上标明瓦时额定值，但在 2009 年 1 月 1 日之前制造的电池除外。

IB.1 一般要求

- 电池芯和电池必须装在符合 4.1.1.1, 1.1.3.1 和 1.1.10（但 1.1.10.1 除外）规定的坚固外包装当中。
- 锂离子电池芯和电池必须在荷电状态不超过其额定容量 30% 的情况下交运。电池芯和/或电池在荷电状态大于其额定容量 30% 的情况下，仅可在始发国和运营人所属国的批准下根据这些国家当局规定的书面条件来运输。

包装说明 965

本报告第 4.1.3.5 段：

注：确定额定容量的相关指南和方法，见联合国《试验和标准手册》的 38.3.2.3 小节。**荷电状态降低的情况下运输的电池芯和电池不太容易发生热失控。**

表 965-IB

内装物	每个包装件净数量	
	客机	货机
锂离子电池芯和电池	禁运	10 kg

本报告第 1.2.1.4.1 b) 段：

IB.2 补充要求

- 电池芯和电池必须装在能够将电池芯或电池完全封装的内包装内，然后再放入坚固、~~结实~~的**硬质**外包装当中。
- 电池芯和电池不得与第 1 类物质和物品（爆炸物）一起放入同一外包装件内，1.4S 项、2.1 项（易燃气体）、第 3 类（易燃液体）、4.1 项（易燃固体）或 5.1 项（氧化性物质）除外。
- 必须保护电池芯和电池防止发生短路。这包括防止在同一包装内与导电材料接触，导致发生短路。
- 每个包装件都必须能够承受从任何方向进行的 1.2 米跌落试验，而不会发生下列情况：
 - 使其中所装的电池芯或电池受损；
 - 使内装物移动，以致电池与电池（或电池芯与电池芯）互相接触；
 - 内装物释出。
- 每个包装件必须能够承受向其顶面施加的力度相当于同样包装件堆叠至 3 米高的总重量（包括试验样品）的压力达 24 小时，而其中所装的电池芯或电池无受损且性能无任何降低。

本报告第 1.2.1.4.1 e) 和 4.1.3.8 段：

注：可通过试验、评估或经验证明承受力。

- 每个包装件除了贴有合适的第 9 类危险性标签（图 5-26）和仅限货机标签（图 5-28）以外，还必须贴有**合适的锂**电池标记（图 5-3）。

IB.3 外包装

箱	桶	方桶
铝	铝	铝
纤维板	纤维	塑料
天然木	其他金属	钢
其他金属	塑料	
塑料	胶合板	
胶合板	钢	
再生木		
钢		

包装说明 966

仅限于 UN 3481（与设备包装在一起）的客机和货机运输

1. 引言

本条目适用于与设备包装在一起的锂离子或锂聚合物电池。

本包装说明第 I 节适用于划入第 9 类的锂离子和锂聚合物电池芯和电池。某些交运的满足本包装说明第 II 节要求的锂离子和锂聚合物电池芯和电池，在受下面第 2 段规定限制的情况下，不受本细则其他补充要求的限制。

联合国《试验和标准手册》第三部分 38.3.2.3 小节中定义的一个单电池芯电池被视为一个“电池芯”，必须根据本包装说明中针对“电池芯”的要求加以运输。

就本包装说明而言，“设备”系指由**锂**电池芯或**锂**电池提供运行电力的装置。

本报告第 1.2.1.4.1 b) 段：

2. 禁止运输的**锂**电池

以下规定适用于本包装说明内所有**锂离子**电池芯和电池：

禁止运输按照特殊规定 A154 查明为已经受损或具有缺陷的电池芯或电池。

I. 第 I 节

每个电池芯或电池必须满足 2;9.3 的规定。

I.1 一般要求

— 必须符合 4;1 的要求。

本报告第 4.1 段：

— 至 2025 年 12 月 31 日

锂离子电池芯和电池应在荷电状态不超过其额定容量 30% 的情况下交运。

— 自 2026 年 1 月 1 日起

锂离子电池芯和电池必须在荷电状态不超过其额定容量 30% 的情况下交运。电池芯和电池在荷电状态超过其额定容量 30% 的情况下，仅可在始发国和运营人所属国的批准下根据这些国家当局规定的书面条件来运输。

注：关于确定额定容量的相关指南和方法，见联合国《试验和标准手册》的 38.3.2.3 小节。荷电状态降低的情况下运输的电池芯和电池不太容易发生热失控。

包装说明 966

本报告第 1.2.1.4.1 b) 段：

表 966-I

联合国编号和运输专用名称	包装件数量（第 I 节）	
	客机	货机
UN 3481 Lithium ion batteries packed with equipment 与设备包装在一起的锂离子 电池	5 kg 锂离子电 芯或电池	35 kg 锂离子电 池芯或电池

I.2 补充要求

- 必须保护锂离子电芯和电池防止短路。这包括防止在同一包装内与导电材料接触，导致发生短路。
- 锂离子电芯和电池必须：
 - 放入能将电芯或电池完全封装的内包装内，然后再放入下列类别所示、满足 II 类包装性能要求的包装，然后与设备一起放入坚固结实的硬质外包装当中；或
 - 放入能将电芯或电池完全封装的内包装内，然后与设备一起放入下列类别所示、满足 II 级包装的性能要求的包装内。
- 设备必须在外包装内得到固定以免移动。
- 每个包装件中的电芯或电池的数量不得超过设备运行所需的数量，外加两组备用电芯或电池。一“组”“电芯或电池为驱动每件设备所需的单个电芯或电池的数量。”
- 2011 年 12 月 31 日之后生产的电池必须在外壳上标明瓦时额定值。

I.3 外包装

箱

铝（4B）
纤维板（4G）
天然木（4C1，4C2）
其他金属（4N）
塑料（4H1，4H2）
胶合板（4D）
再生木（4F）
钢（4A）

桶

铝（1B2）
纤维（1G）
其他金属（1N2）
塑料（1H2）
胶合板（1D）
钢（1A2）

方桶

铝（3B2）
塑料（3H2）
钢（3A2）

包装说明 966

II. 第 II 节

与设备一起包装的**锂离子**电池芯和电池，如满足本包装说明第 II 节中要求，则仅需遵守本细则中的如下补充规定：

- 第 1 部分 2.3（概论 — 危险物品的邮寄运输）；
- 第 5 部分 2.4.16（托运人的责任 — 锂电池或钠离子电池的特殊标记要求）；
- 第 7 部分 4.4（运营人的责任 — 危险物品事故和事故征候的报告）；
- 第 7 部分 4.5（运营人的责任 — 报告未申报的和错误申报的危险物品）；
- 第 8 部分 1.1（有关旅客和机组成员的规定 — 旅客或机组成员携带的危险物品）；和
- 本包装说明第 1 段和第 2 段。

可以交运**锂离子**电池芯和电池，条件是每个电池芯和电池都满足 2:9.3 a)、e)和 g)的规定以及以下条件：

- 1) **锂离子**电池芯的瓦时额定值（见附录 2 的术语汇编）不超过 20Wh；
- 2) **锂离子**电池的瓦时额定值不超过 100Wh；
 - 必须在电池盒外壳上标明瓦时额定值，但在 2009 年 1 月 1 日之前制造的电池除外。

本报告第 4.1 段：

II.1 一般要求

— 至 2025 年 12 月 31 日

锂离子电池芯和电池应在荷电状态不超过其额定容量 30% 的情况下交运。

— 自 2026 年 1 月 1 日起

— 瓦时额定值超过 2.7 瓦时的**锂离子**电池芯和电池必须在荷电状态不超过其额定容量 30% 的情况下交运。电池芯和/或电池在荷电状态超过其额定容量 30% 的情况下，必须根据本包装说明第 I 节的规定，在始发国和运营人所属国的批准下根据这些国家当局规定的书面条件来运输。

— 瓦时额定值不超过 2.7 瓦时的**锂离子**电池芯和电池在交运时，其荷电状态不应超过其额定容量的 30%。

注：关于确定额定容量的相关指南和方法，见联合国《试验和标准手册》第 38.3.2.3 小节。荷电状态降低的情况下运输的**锂离子**电池芯和电池不太容易发生热失控。

本报告第 1.2.1.4.1 b) 段：

表 966-II

内装物	包装件数量（第 II 节）	
	客机	货机
每个包装件内 锂离子 电池芯或电池的净量	5 kg	5 kg

包装说明 966

II.2 补充要求

- 锂离子~~子~~电池芯和电池必须：
 - 放入能将电池芯或电池完全封装的内包装内，然后再放入符合 4;1.1.1、1.1.3.1 和 1.1.10（但 1.1.10.1 除外）规定的坚固~~、结实的~~硬质外包装当中；或
 - 放入能将电池芯或电池完全封装的内包装内，然后与设备一起放入符合 4;1.1.1、1.1.3.1 和 1.1.10（但 1.1.10.1 除外）规定的坚固~~、结实的~~硬质外包装当中。
- 必须保护电池芯和电池，以防发生短路。这包括防止在同一包装内与导电材料接触，导致发生短路。
- 设备必须在外包装内得到固定以免移动。
- 每个包装件内的电池芯或电池数目不得超过设备运行所需的数量，外加两组备用电池芯或电池。一“组”电池芯或电池为驱动每件设备所需的单个电池芯或电池的数量。
- 每个电池芯或电池包装件，或完成包装件，都必须能够承受从任何方向进行的 1.2 米跌落试验，而不会发生下列情况：
 - 使其中所装的电池芯或电池受损；
 - 内装物移动，以致电池与电池（或电池芯与电池芯）互相接触；
 - 内装物释出。

本报告第 4.1.3.8 段：

- 每个电池芯或电池包装件，或完成包装件，必须能够承受向其顶部施加的力度相当于同样包装件堆叠至 3 米高的总重量（包括试验样品）的压力达 24 小时，而其中所装的电池芯或电池无受损且性能无任何降低。

注：可通过试验、评估或经验证明承受力。

本报告第 1.2.1.4.1 b) 和 e) 段：

- 每个包装件必须贴有合适的~~锂~~电池标记（图 5-3）。
 - 包装件的大小必须使得有足够空间在某一侧粘贴标记，且标记不会出现折叠。
- 如果使用航空货运单，则必须在航空货运单上写上“lithium ion batteries, in compliance with Section II of PI966”（锂离子电池，符合 PI966 第 II 节）的字样。如果一个航空货运单上包含可满足多个包装说明第 II 节要求的~~锂~~电池的包装件，不同~~锂~~电池类型和/或包装说明的合规声明可以合并为一个单一声明，前提是该声明注明适用的~~锂~~电池类型和包装说明编号。
- 如果包装件既含有装在设备中、也含有与设备包装在一起、符合第 II 节~~锂~~电池芯或电池限制的~~锂~~电池，则适用以下要求：
 - 托运人必须确保符合两项包装说明的所有适用部分。所有包装件中含有的~~锂~~电池的总质量不得超过 5 千克；
 - 如果使用航空货运单，则必须在航空货运单上写上“lithium ion batteries, in compliance with Section II of PI966”（锂离子电池，符合 PI966 第 II 节）的字样。
- 为电池芯或电池进行运输准备或将其交付运输的任何人员，必须接受与负责的职能相符的关于这些要求的适当指示。

II.3 外包装

箱	桶	方桶
铝	铝	铝
纤维板	纤维	塑料
天然木	其他金属	钢
其他金属	塑料	
塑料	胶合板	
胶合板	钢	
再生木		
钢		

包装说明 966**II.4 合成包装件**

当包装件放在合成包装件内时：

- a) 这些包装件必须牢靠地装在合成包装件内；
- b) 合成包装件不得影响每个包装件应有的功能；和

本报告第 1.2.1.4.1 e) 段：

- c) 本包装说明所要求的**锂**电池标记（图 5-3）必须清楚可见，或将标记印在合成包装件外面，而且合成包装件必须标有字高应至少为 12 毫米的“Overpack”（合成包装件）的字样。

包装说明 967

仅限于 UN 3481（装在设备中）的客机和货机运输

1. 引言

本条目适用于装在设备中的锂离子或锂聚合物电池。

本包装说明第 I 节适用于划入第 9 类的锂离子和锂聚合物电池芯和电池。某些交运的满足本包装说明第 II 节要求的锂离子和锂聚合物电池芯和电池，在受下面第 2 段规定限制的条件，不受本细则其他补充要求的限制。

联合国《试验和标准手册》第三部分 38.3.2.3 小节中定义的一个单电池芯电池被视为一个“电池芯”，必须根据本包装说明中针对“电池芯”的要求加以运输。

就本包装说明而言，“设备”系指由**锂**电池芯或**锂**电池提供运行电力的装置。

本报告第 1.2.1.4.1 b) 段：

2. 禁止运输的**锂**电池

以下规定适用于本包装说明内所有**锂离子**电池芯和电池：

禁止运输按照特殊规定 A154 查明为已经受损或具有缺陷的电池芯或电池。

I. 第 I 节

每个电池芯或电池必须满足 2;9.3 的规定。

本报告第 4.1 段：

1.1 一般要求

- 设备应在以下情况下交运：
 - 电池芯和电池荷电状态不超过其额定容量的 30%；或
 - 指示的电池容量不超过 25%。

注：关于确定额定容量的相关指南和方法，见联合国《试验和标准手册》第 38.3.2.3 小节。荷电状态降低的情况下运输的电池芯和电池不太容易发生热失控。

- 设备必须装在符合第 4;1.1.1, 1.1.3.1 和 1.1.10（但 1.1.10.1 除外）的坚固**结实**的硬质外包装当中。对于大型设备，如果该设备对其所装的电池芯或电池提供了等效保护，则可不需包装或可放在货板上交付运输。

本报告第 1.2.1.4.1 b) 段：

表 967-I

联合国编号和运输专用名称	包装件数量（第 I 节）	
	客机	货机
UN 3481 Lithium ion batteries contained in equipment 装在设备中的锂离子电池	5 kg 锂离子 电池芯或电池	35 kg 锂离子 电池芯或电池

包装说明 967

本报告第 4.1.3.8 段：

1.2 补充要求

- 设备必须在外包装内得到固定以免移动，必须配备防止发生意外启动的有效装置。
- 当多件设备装在同一个外包装中时，每件设备必须包装好防止与其他设备接触。
- 每个包装件必须能够承受向其顶面施加的力度相当于同样包装件堆叠至 3 米高的总重量（包括试验样品）的压力达 24 小时，而其中所装设备无受损且性能无任何降低。对于未包装或放在货板上交运的大型设备，不受 3 米高堆码试验能力的要求限制。

注：可通过试验、评估或经验证明承受力。

- 2011 年 12 月 31 日之后生产的电池必须在外壳上标明瓦时额定值。

1.3 外包装

箱	桶	方桶
铝	铝	铝
纤维板	纤维	塑料
天然木	其他金属	钢
其他金属	塑料	
塑料	胶合板	
胶合板	钢	
再生木		
钢		

包装说明 967

本报告第 1.2.1.4.1 b) 段：

II. 第 II 节

装在设备中的**锂离子**电池芯和电池，如满足本包装说明第 II 节中要求，则仅需遵守本细则中的如下补充规定：

- 第 1 部分 2.3（概论 — 危险物品的邮寄运输）；
- 第 5 部分 2.4.16（托运人的责任 — 锂电池或钠离子电池的特殊标记要求）；
- 第 7 部分 4.4（运营人的责任 — 危险物品事故和事故征候的报告）；
- 第 7 部分 4.5（运营人的责任 — 报告未申报的和错误申报的危险物品）；
- 第 8 部分 1.1（有关旅客和机组成员的规定 — 旅客或机组成员携带的危险物品）；和
- 本包装说明第 1 段和第 2 段。

可以交运**锂离子**电池芯和电池，条件是每个电池芯和电池都满足 2;9.3 a)、e) 和 g) 的规定以及以下条件：

- 1) **锂离子**电池芯的瓦时额定值（见附录 2 的术语汇编）不超过 20 Wh；
- 2) **锂离子**电池的瓦时额定值不超过 100 Wh；
 - 必须在电池盒外壳上标明瓦时额定值，但在 2009 年 1 月 1 日之前制造的电池除外。

射频识别（RFID）标签、手表和温度记录仪等无法产生危险热量的装置，在故意激活状态下可以运输。这些装置在激活状态下，必须满足规定的电磁辐射标准，确保装置的运行不会对航空器系统产生干扰。必须确保运输途中该装置不会发出干扰信号（如蜂鸣警报、灯光闪烁等）。

本报告第 4.1 段：

II.1 一般要求

- 设备应在以下情况下交运：
 - 电池芯和电池荷电状态不超过其额定容量的 30%；或
 - 指示的电池容量不超过 25%。

注：关于确定额定容量的相关指南和方法，见联合国《试验和标准手册》的 38.3.2.3 小节。荷电状态降低的情况下运输的电池芯和电池不太容易发生热失控。

- 设备必须装在符合 4;1.1.1, 1.1.3.1 和 1.1.10（但 1.1.10.1 除外）规定的坚固**结实**的硬质外包装当中。对于大型设备，如果该设备对其所装的电池芯或电池提供了等效保护，则可不需包装或可放在货板上交付运输。

本报告第 1.2.1.4.1 b) 段：

表 967-II

内装物	包装件数量（第 II 节）	
	客机	货机
每个包装件内 锂离子 电池芯或电池的净量	5 kg	5 kg

本报告第 4.1.3.8 段：

包装说明 967

II.2 补充要求

- 设备必须在外包装内得到固定以免移动，并配备防止发生意外启动的有效装置。
- 必须保护锂离子电池芯和电池防止短路。
- 当多件设备装在同一个外包装中时，每件设备必须包装好防止与其他设备接触。
- 每个包装件必须能够承受向其顶部施加的力度相当于同样包装件堆叠至 3 米高的总重量（包括试验样品）的压力达 24 小时，而其中所装设备无受损且性能无任何降低。对于未包装的或放在货板上交运的大型设备，不受 3 米高堆码试验能力的要求限制。

注：可通过试验、评估或经验证明承受力。

本报告第 1.2.1.4.1 b) 和 e) 段：

- 每个包装件都必须贴有合适的锂电池标记（图 5-3）。包装件的大小必须使得有足够空间在某一侧粘贴标记，且标记不会出现折叠。
 - 下列情况下，此项要求不适用：
 - 包装件仅含有装在设备（包括线路板）中的纽扣式电池；和
 - 在托运货物中的包装件数不超过两件的情况下，包装件所盛装的装在设备中的电池芯或电池分别不超过四个和两个。
- 如果托运货物中含有锂电池标记（图 5-3）的包装，则在使用航空货运单时，货运单上必须写明“锂离子电池，符合 PI967 第 II 节”的字样。如果一个航空货运单上包含可满足多个包装说明第 II 节要求的锂电池的包装件，不同锂电池类型和/或包装说明的合规声明可以合并为一个单一声明，前提是该声明注明适用的锂电池类型和包装说明编号。
- 为电池芯或电池进行运输准备或将其交付运输的任何人员，必须接受与负责的职能相符的关于这些要求的适当指示。

II.3 外包装

箱	桶	方桶
铝	铝	铝
纤维板	纤维	塑料
天然木	其他金属	钢
其他金属	塑料	
塑料	胶合板	
胶合板	钢	
再生木		
钢		

II.4 合成包装件

当包装件放在合成包装件内时：

- a) 这些包装件必须牢靠地装在合成包装件内；
- b) 合成包装件不得影响每个包装件应有的功能；和

本报告第 1.2.1.4.1 e) 段：

- c) 本包装说明所要求的锂电池标记（图 5-3）必须清楚可见，或将标记印在合成包装件外面，而且合成包装件必须标有字高应至少为 12 毫米的“Overpack”（合成包装件）的字样。

本报告第 1.2.1.4.1 b) 段：

包装说明 968

仅限货机 UN 3090

1. 引言

本条目适用于锂金属或锂合金电池。本包装说明的结构如下：

- IA 节适用于锂金属含量超过 1 克的锂金属电池芯和锂金属含量超过 2 克的锂金属电池，这些电池芯和电池必须划入第 9 类并须受本细则所有有关要求的限制；和
- IB 节适用于锂金属含量不超过 1 克的锂金属电池芯和锂金属含量不超过 2 克的锂金属电池。

联合国《试验和标准手册》第三部分 38.3.2.3 小节中定义的一个单电池芯电池被视为一个“电池芯”，必须根据本包装说明中针对“电池芯”的要求加以运输。

2. 禁止运输的锂电池

以下规定适用于本包装说明内所有锂电池芯和电池：

禁止运输按照特殊规定 A154 查明为已经受损或具有缺陷的电池芯或电池。

除非得到始发国和运营人所属国的国家有关当局批准，禁止航空运输废弃锂电池芯或电池，以及为回收或处置目的运输的锂电池芯或电池。

IA. 第 IA 节

每个电池芯或电池必须满足 2:9.3 的规定。

IA.1 一般要求

必须符合 4:1 的要求。

表 968-IA

联合国编号和运输专用名称	每个包装件净数量	
	客机	货机
UN 3090 Lithium metal batteries 锂金属电池	禁运	35 kg

IA.2 补充要求

- 必须保护锂电池芯和电池以防短路。
- 锂电池芯和电池必须放入能将电池芯或电池完全封装的内包装内，然后再放入外包装。电池芯或电池的完成包装件必须符合 II 级包装的性能要求。
- 锂电池芯和电池不得与第 1 类物质和物品（爆炸物）一起装在同一个外包装中，1.4S 项、2.1 项（易燃气体）、第 3 类（易燃液体）、4.1 项（易燃固体）或 5.1 项（氧化性物质）除外。
- 经始发国有关当局批准，质量超过 12 kg 且具有耐冲撞坚固外壳的锂电池芯或电池，可以放在不受本细则第 6 部分要求限制的坚固外包装或保护封罩中（如完全封闭的箱子或木制板条箱）进行运输。批准文件必须随附托运货物。

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IA.3 外包装

箱	桶	方桶
铝 (4B)	铝 (1B2)	铝 (3B2)
纤维板 (4G)	纤维 (1G)	塑料 (3H2)
天然木 (4C1, 4C2)	其他金属 (1N2)	钢 (3A2)
其他金属 (4N)	塑料 (1H2)	
塑料 (4H1, 4H2)	胶合板 (1D)	
胶合板 (4D)	钢 (1A2)	
再生木 (4F)		
钢 (4A)		

IB. 第 IB 节

根据本节包装的**锂金属**电池芯或电池须受本细则所有有关规定的限制（包括本包装说明第 2 段和本节要求在内），但以下第 6 部分的规定除外：

必须根据第 IB 节的规定，在 5.4 部分的危险物品运输文件上说明所托运的**锂金属**电池芯或电池。必须在 5.4.1 和 5.8.1a)部分所规定的包装说明号码“968”之后加上“IB”字样。5.4 部分所有其他适用的规定均应适用。

可以交运**锂金属或锂合金**电池芯和电池，条件是每个电池芯和电池都满足 2.9.3 a)、e)、f)（如适用）和 g) 的规定以及以下条件：

- 1) 对于**锂金属**电池芯，锂含量不超过 1 克；
- 2) 对于**锂金属或锂合金**电池，合计锂含量不超过 2 克。

IB.1 一般要求

电池芯和电池必须装在符合 4.1.1.1, 1.1.3.1 和 1.1.10（但 1.1.10.1 除外）规定的坚固外包装当中。

表 968-IB

内装物	每个包装件净数量	
	客机	货机
锂金属电池芯和电池	禁运	2.5 kg

IB.2 补充要求

- 电池芯和电池必须装在能够将电池芯或电池完全封装的内包装内，然后再放入坚固、~~结实~~的硬质外包装当中。
- 电池芯和电池不得与第 1 类物质和物品（爆炸物）一起装在同一个外包装中，1.4S 项、2.1 项（易燃气体）、第 3 类（易燃液体）、4.1 项（易燃固体）或 5.1 项（氧化性物质）除外。
- 必须保护锂离子电池芯和电池防止短路。这包括防止在同一包装内与导电材料接触，导致发生短路。
- 每个包装件都必须能够承受从任何方向进行的 1.2 米跌落试验，而不会发生下列情况：
 - 使其中所装的电池芯或电池受损；
 - 使内装物移动，以致电池与电池（或电池芯与电池芯）互相接触；
 - 内装物释出。
- 每个包装件必须能够承受向其顶面施加的力度相当于同样包装件堆叠至 3 米高的总重量（包括试验样品）的压力达 24 小时，而其中所装的电池芯或电池无受损且性能无任何降低。

本报告第 4.1.3.8 段：

注：可通过试验、评估或经验证明承受力。

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本报告第 1.2.1.4.1 b) 段:

- 每个包装件除了贴有合适的第 9 类危险性标签（图 5-26）和仅限货机标签（图 5-28）以外，还必须贴有合适的锂电池标记（图 5-3）。

IB.3 外包装

箱	桶	方桶
铝	铝	铝
纤维板	纤维	塑料
天然木	其他金属	钢
其他金属	塑料	
塑料	胶合板	
胶合板	钢	
再生木		
钢		

本报告第 1.2.1.4.1 b) 段：

包装说明 969

仅限于 UN 3091（与设备包装在一起）的客机和货机运输

本报告第 1.2.1.4.1 b) 段：

1. 引言

本条目适用于与设备包装在一起的锂金属或锂合金电池。

本包装说明第 I 节适用于划入第 9 类的锂金属和锂合金电池芯和电池。某些交运的满足本包装说明第 II 节要求的锂金属和锂合金电池芯和电池，在受下面第 2 段规定限制的情况下，不受本细则其他补充要求的限制。

联合国《试验和标准手册》第三部分 38.3.2.3 小节中定义的一个单电池芯电池被视为一个“电池芯”，必须根据本包装说明中针对“电池芯”的要求加以运输。

就本包装说明而言，“设备”系指由锂⁺电池芯或锂⁺电池提供运行电力的装置。

2. 禁止运输的锂电池

以下规定适用于本包装说明内所有锂⁺金属电池芯和电池：

禁止运输按照特殊规定 A154 查明为已经受损或具有缺陷的电池芯或电池。

I. 第 I 节

每个电池芯或电池必须满足 2;9.3 的规定。

I.1 一般要求

必须符合 4;1 的要求。

表 969-I

联合国编号和运输专用名称		包装件数量（第 I 节）	
UN 3091	Lithium metal batteries packed with equipment 与设备包装在一起的锂金属电池	客机	货机
		5 kg 锂 ⁺ 金属电池芯或电 池	35 kg 锂 ⁺ 金属电池芯或电 池

包装说明 969

I.2 补充要求

- 必须保护**锂金属**电池芯和电池防止短路。这包括防止在同一包装内与导电材料接触，导致发生短路。
- **锂金属**电池芯和电池必须：
 - 放入能将电池芯或电池完全封装的内包装内，然后再放入下列类别所示、满足 II 类包装性能要求的包装，然后与设备一起放入坚固**结实**的**硬质**外包装当中；或
 - 放入能将电池芯或电池完全封装的内包装内，然后与设备一起放入一个下列类别所示、满足 II 级包装性能要求的包装当中。
- 设备在外包装内必须加以固定，以免发生移动。
- 每个包装件中的电池芯或电池的数量不得超过设备运行所需的数量，外加两组备用电池芯或电池。一“组”电池芯或电池为驱动每件设备所需的单个电池芯或电池的数量。
- 对于准备作为第 9 类用客机运输的锂金属电池芯和电池：
 - 交付客机运输的电池芯和电池必须放入中层包装或硬金属外壳包装，并用不燃烧、不导电的衬垫材料裹好，放入一个外包装内。

I.3 外包装

箱	桶	方桶
铝 (4B)	铝 (1B2)	铝 (3B2)
纤维板 (4G)	纤维 (1G)	塑料 (3H2)
天然木 (4C1, 4C2)	其他金属 (1N2)	钢 (3A2)
其他金属 (4N)	塑料 (1H2)	
塑料 (4H1, 4H2)	胶合板 (1D)	
胶合板 (4D)	钢 (1A2)	
再生木 (4F)		
钢 (4A)		

II. 第 II 节

装在设备中的锂金属或锂合金与设备包装在一起的电池芯和电池，如满足本包装说明第 II 节中要求，则仅需遵守本细则中的如下补充规定：

- 第 1 部分 2.3 (概论 — 危险物品的邮寄运输)；
- 第 5 部分 2.4.16 (托运人的责任 — 锂电池或钠离子电池的特殊标记要求)；
- 第 7 部分 4.4 (运营人的责任 — 危险物品事故和事故征候的报告)；
- 第 7 部分 4.5 (运营人的责任 — 报告未申报的和错误申报的危险物品)；
- 第 8 部分 1.1 (有关旅客和机组成员的规定 — 旅客或机组成员携带的危险物品)；和
- 本包装说明第 1 段和第 2 段。

可以交运锂金属电池芯和电池，条件是每个电池芯和电池都满足 2;9.3 a)、e)、f) (如果适用) 和 g) 的规定以及以下条件：

- 1) 对于**锂金属**电池芯，锂含量不超过 1 克；
- 2) 对于**锂金属或锂合金**电池，合计锂含量不超过 2 克。

包装说明 969

II.1 一般要求

表 969-II

内装物	包装件数量 (第 II 节)	
	客机	货机
每个包装件内 锂金属 电池芯或电池的净量	5 kg	5 kg

II.2 补充要求

- **锂金属**电池芯和电池必须：
 - 放入能将电池芯或电池完全封装的内包装内，然后再放入符合 4;1.1.1、1.1.3.1 和 1.1.10（但 1.1.10.1 除外）规定的坚固、~~结实~~的**硬质**外包装当中；或
 - 放入能将电池芯或电池完全封装的内包装内，然后与设备一起放入符合 4;1.1.1、1.1.3.1 和 1.1.10（但 1.1.10.1 除外）规定的坚固、~~结实~~的**硬质**外包装当中。
- 必须保护电池芯和电池，以防发生短路。这包括防止在同一包装内与导电材料接触，导致发生短路。
- 设备必须在外包装内得到固定以免发生移动。
- 每个包装件内的电池芯或电池数目不得超过设备运行所需的数量，外加两组备用电池芯或电池。一“组”电池芯或电池为驱动每件设备所需的单个电池芯或电池的数量。
- 每个电池芯或电池包装件，或完成包装件，都必须能够承受从任何方向进行的 1.2 米跌落试验，而不会发生下列情况：
 - 使其中所装的电池芯或电池受损；
 - 使内装物移动，以致电池与电池（或电池芯与电池芯）互相接触；
 - 内装物释出。

本报告第 4.1.3.8 段：

- 每个电池芯或电池包装件，或完成包装件，必须能够承受向其顶面施加的力度相当于同样包装件堆叠至 3 米高的总重量（包括试验样品）的压力达 24 小时，而其中所装的电池芯或电池无受损且性能无任何降低。

注：可通过试验、评估或经验证明承受力。

本报告第 1.2.1.4.1 b) 段：

- 每个包装件必须贴有**合适的**锂电池标记（图 5-3）。
 - 包装件的大小必须使得有足够空间在某一侧粘贴标记，且标记不会出现折叠。
- 如果使用航空货运单，则必须在航空货运单上写上“**lithium metal batteries, in compliance with Section II of PI969**”（锂金属电池，符合 PI 969 第 II 节）的字样。如果一个航空货运单上包含可满足多个包装说明第 II 节要求的**锂**电池的包装件，不同**锂**电池类型和/或包装说明的合规声明可以合并为一个单一声明，前提是该声明注明适用的**锂**电池类型和包装说明编号。
- 如果包装件既含有装在设备中、也含有与设备包装在一起、符合第 II 节**锂**电池芯或电池限制的**锂**电池，则适用以下要求：
 - 托运人必须确保符合两项包装说明的所有适用部分。所有包装件中含有的**锂**电池的总质量不得超过 5 千克；
 - 如果使用航空货运单，则必须在航空货运单上写上“**lithium metal batteries, in compliance with Section II of PI969**”（锂金属电池，符合 PI 969 第 II 节）的字样。
- 为电池芯或电池进行运输准备或将其交付运输的任何人员，必须接受与负责的职能相符的关于这些要求的适当指示。

包装说明 969

II.3 外包装

箱	桶	方桶
铝	铝	铝
纤维板	纤维	塑料
天然木	其他金属	钢
其他金属	塑料	
塑料	胶合板	
胶合板	钢	
再生木		
钢		

II.4 合成包装件

当包装件放在合成包装件内时：

- a) 这些包装件必须牢靠地装在合成包装件内；
- b) 合成包装件不得影响每个包装件应有的功能；和
- c) 本包装说明所要求的锂电池标记（图 5-3）必须清晰可见，或者标记必须印在合成包装件外面，而且合成包装件必须标有字高应至少为 12 毫米的“Overpack”（合成包装件）的字样。

本报告第 1.2.1.4.1 b) 段:

包装说明 970

仅限于 UN 3091（装在设备中）的客机和货机运输

1. 引言

本条目适用于装在设备中的锂金属或锂合金电池。

本包装说明第 I 节适用于划入第 9 类的锂金属和锂合金电池芯和电池。某些交运的满足本包装说明第 II 节要求的锂金属和锂合金电池芯和电池，在受下面第 2 段规定限制的情况下，不受本细则其他补充要求的限制。

联合国《试验和标准手册》第三部分 38.3.2.3 小节中定义的一个单电池芯电池被视为一个“电池芯”，必须根据本包装说明中针对“电池芯”的要求加以运输。

就本包装说明而言，“设备”系指由锂电池芯或锂电池提供运行电力的装置。

本报告第 1.2.1.4.1 b) 段:

2. 禁止运输的锂电池

以下规定适用于本包装说明内所有锂金属电池芯和电池：

禁止运输按照特殊规定 A154 查明为已经受损或具有缺陷的电池芯或电池。

I. 第 I 节

每个电池芯或电池必须满足 2;9.3 的规定。

I.1 一般要求

设备必须装在符合 4;1.1.1, 1.1.3.1 和 1.1.10（但 1.1.10.1 除外）的坚固结实的硬质外包装当中。对于大型设备，如果该设备对其所装的电池芯或电池提供了等效保护，则可不需包装或可放在货板上交付运输。

表 970-I

联合国编号和运输专用名称	包装件数量（第 I 节）	
	客机	货机
UN 3091 Lithium metal batteries contained in equipment 装在设备中的锂金属电池	5 kg 锂金属电池芯或电 池	35 kg 锂金属电池芯或电 池

I.2 补充要求

- 设备必须在外包装内得到固定以免移动，并且必须配备防止发生意外启动的有效装置。
- 当多件设备装在同一个外包装中时，每件设备必须包装好防止与其他设备接触。

本报告第 4.1.3.8 段:

- 每个包装件必须能够承受向其顶面施加的力度相当于同样包装件堆叠至 3 米高的总重量（包括试验样品）的压力达 24 小时，而其中所装设备无受损且性能无任何降低。对于未包装的或放在货板上交运的大型设备，不受 3 米高堆码试验能力的要求限制。

注：可通过试验、评估或经验证明承受力。

- 任何一件设备中的锂金属含量，对于每个电池芯而言不得超过 12 克，对于每个电池而言不得超过 500 克。

包装说明 970

I.3 外包装

箱	桶	方桶
铝	铝	铝
纤维板	纤维	塑料
天然木	其他金属	钢
其他金属	塑料	
塑料	胶合板	
胶合板	钢	
再生木		
钢		

本报告第 1.2.1.4.1 b) 段：

II. 第 II 节

装在设备中的**锂金属或锂合金**电池芯和电池，如满足本包装说明第 II 节中要求，则仅需遵守本细则中的如下补充规定：

- 第 1 部分 2.3（概论 — 危险物品的邮寄运输）；
- 第 5 部分 2.4.16（托运人的责任 — 锂电池或钠离子电池的特殊标记要求）；
- 第 7 部分 4.4（运营人的责任 — 危险物品事故和事故征候的报告）；
- 第 7 部分 4.5（运营人的责任 — 报告未申报的和错误申报的危险物品）；
- 第 8 部分 1.1（有关旅客和机组成员的规定 — 旅客或机组成员携带的危险物品）；和
- 本包装说明第 1 段和第 2 段。

可以交运**锂金属**电池芯和电池，条件是每个电池芯和电池都满足 2;9.3 a)、e)、f)（如果适用）和 g) 的规定以及以下条件：

- 1) 对于**锂金属**电池芯，锂含量不超过 1 克；
- 2) 对于**锂金属或锂合金**电池，合计锂含量不超过 2 克。

射频识别（RFID）标签、手表和温度记录仪等无法产生危险热量的装置，在故意激活状态下可以运输。这些装置在激活状态下，必须满足规定的电磁辐射标准，确保装置的运行不会对航空器系统产生干扰。必须确保运输途中该装置不会发出干扰信号（如蜂鸣警报、灯光闪烁等）。

II.1 一般要求

设备必须装在符合 4;1.1.1、1.1.3.1 和 1.1.10（但 1.1.10.1 除外）规定的坚固**结实**的**硬质**外包装当中。对于大型设备，如果该设备对其所装的电池芯或电池提供了等效保护，则可不需包装或可放在货板上交付运输。

表 970-II

内装物	包装件数量（第 II 节）	
	客机	货机
每个包装件内 锂金属 电池芯或电池的净量	5 kg	5 kg

包装说明 970

本报告第 4.1.3.8 段:

II.2 补充要求

- 设备必须在外包装内得到固定以免移动，并且必须配备防止发生意外启动的有效装置。
- 必须保护锂离子电池芯和电池防止短路。
- 当多件设备装在同一个外包装中时，每件设备必须包装好防止与其他设备接触。
- 每个包装件必须能够承受向其顶面施加的力度相当于同样包装件堆叠至 3 米高的总重量（包括试验样品）的压力达 24 小时，而其中所装设备无受损且性能无任何降低。对于未包装的或放在货板上交运的大型设备，不受 3 米高堆码试验能力的要求限制。

注：可通过试验、评估或经验证明承受力。

本报告第 1.2.1.4.1 b) 段:

- 每个包装件都必须贴有合适的锂电池标记（图 5-3）。包装件的大小必须使得有足够空间在某一侧粘贴标记，且标记不会出现折叠。
 - 下列情况下，此项要求不适用：
 - 包装件仅含有装在设备（包括线路板）中的纽扣式电池；和
 - 在托运货物中的包装件数不超过两件的情况下，包装件所盛装的装在设备中的电池芯或电池分别不超过四个和两个。
- 如果托运货物包括带有锂电池标记（图 5-3）的包装件，使用航空货运单时，则必须在航空货运单上写上“lithium metal batteries, in compliance with Section II of PI970”（锂金属电池，符合 PI 970 第 II 节）的字样。如果一个航空货运单上包含可满足多个包装说明第 II 节要求的锂电池的包装件，不同锂电池类型和/或包装说明的合规声明可以合并为一个单一声明，前提是该声明注明适用的锂电池类型和包装说明编号。
- 为电池芯或电池进行运输准备或将其交付运输的任何人员，必须接受与负责的职能相符的关于这些要求的适当指示。

II.3 外包装

箱	桶	方桶
铝	铝	铝
纤维板	纤维	塑料
天然木	其他金属	钢
其他金属	塑料	
塑料	胶合板	
胶合板	钢	
再生木		
钢		

II.4 合成包装件

当包装件放在合成包装件内时：

- a) 这些包装件必须牢靠地装在合成包装件内；
- b) 合成包装件不得影响每个包装件应有的功能；和
- c) 本包装说明所要求的锂电池标记（图 5-3）必须清晰可见，或将标记印在合成包装件外面，而且合成包装件必须标有字高应至少为 12 毫米的“Overpack”（合成包装件）的字样。

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包装说明 972**电池**

所有电池都必须安装并牢固地固定在机器或设备的电池盒中，并采取保护措施以防止损坏和短路。此外：

DGP/29-WP/2 号文件第 4.2.2.3 段：

- 1) 如果安装的是非防漏型电池，并且机器或设备的装卸方式有可能使得电池不会保持其预期朝向，则必须将电池拆下，并酌情按包装说明 ~~492~~或 870 进行包装。
- 2) 如果安装的是锂电池：
 - i) 禁止运输按照特殊规定 A154 查明为已经受损或具有缺陷的锂电池；和
 - ii) 这些电池必须满足第 2 部分 9.3 中规定，但是出于试验目的予以运输的生产之前的锂电池或电池芯原型或低产量的锂电池或电池芯，没有按联合国《试验和标准手册》的第 III 部分 38.3 节的要求进行过测试的，如果经始发国和运营人所属国有关当局的批准，可以在货机上运输。托运货物必须随附一份批准文件。
- 3) 如果安装的是钠金属或钠合金电池，它们必须符合特殊规定 A94 中要求。

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DGP/29-WP/3 号文件第 4.1.2.1.5.2 段和本报告第 1.2.1.4 d) 段：

包装说明 976

UN 3551 仅限货机运输

1. 引言

本条目适用于钠离子电池。

联合国《试验和标准手册》第 III 部分 38.3.2.3 小节中定义的一个单电池芯电池被视为一个“电池芯”，必须根据本包装说明中针对“电池芯”的要求加以运输。

2. 禁止运输的电池

以下规定适用于本包装说明内所有电池芯和电池：

禁止运输按照特殊规定 A154 查明为已经受损或具有缺陷的电池芯或电池。

除非得到始发国和运营人所属国的国家有关当局批准，禁止航空运输废弃电池芯或电池，以及为回收或处置目的运输的电池芯或电池。

I.1 一般要求

- 每个电池芯或电池必须满足 2;9.4 的规定。
- 必须符合 4;1 的要求。
- 电池芯和电池必须在荷电状态不超过其额定容量 30% 的情况下交运。电池芯和/或电池在荷电状态大于其额定容量 30% 的情况下，仅可在始发国和运营人所属国的批准下根据这些国家当局规定的书面条件来运输。

注：关于确定额定容量的相关指南和方法，见联合国《试验和标准手册》的 38.3.2.3 小节。荷电状态降低的情况下运输的电池芯和电池不太容易发生热失控。

- 2025 年 12 月 31 日之后生产的电池必须在外壳上标明瓦时额定值。

I.2 补充要求

- 必须保护电池芯和电池免于短路。
- 电池芯和电池必须放入能将电池芯或电池完全封装的内包装内，然后再放入外包装。电池芯或电池的完成包装件必须满足 II 级包装的性能要求。
- 电池芯和电池不得与第 1 类物质和物品（爆炸物）一起放入同一外包装内，但 1.4S 项、2.1 项（易燃气体）、第 3 类（易燃液体）、4.1 项（易燃固体）或 5.1 项（氧化性物质）除外。
- 经始发国有关当局批准，质量超过 12 kg 且具有耐冲撞坚固外壳的电池芯或电池，可以放在不受本细则第 6 部分要求限制的坚固外包装或保护封罩中（如完全封闭的箱子或木制板条箱）进行运输。批准文件必须随附托运货物。

表 976

联合国编号和运输专用名称	每个包装件净数量	
	客机	货机
UN 3551 Sodium ion batteries 钠离子电池	禁运	35 kg

包装说明 976

I.3 外包装

箱

铝 (4B)
纤维板 (4G)
天然木 (4C1, 4C2)
其他金属 (4N)
塑料 (4H1, 4H2)
胶合板 (4D)
再生木 (4F)
钢 (4A)

桶

铝 (1B2)
纤维 (1G)
其他金属 (1N2)
塑料 (1H2)
胶合板 (1D)
钢 (1A2)

方桶

铝 (3B2)
塑料 (3H2)
钢 (3A2)

包装说明 977

仅限于 UN 3552（与设备包装在一起）的客机 and 仅限货机运输

1. 引言

本条目适用于与设备包装在一起的钠离子电池。

本包装说明第 I 节适用于划入第 9 类的钠离子电池芯和电池。某些交运的满足本包装说明第 II 节要求的钠离子电池芯和电池，在受下面第 2 段规定限制的条件下，不受本细则其他补充要求的限制。

联合国《试验和标准手册》第 III 部分 38.3.2.3 小节中定义的一个单电池芯电池被视为一个“电池芯”，必须根据本包装说明中针对“电池芯”的要求加以运输。

就本包装说明而言，“设备”系指由电池芯或电池提供运行电力的装置。

2. 禁止运输的电池

以下规定适用于本包装说明内所有电池芯和电池：

禁止运输按照特殊规定 A154 查明为已经受损或具有缺陷的电池芯或电池。

I. 第 I 节

每个电池芯或电池必须满足 2;9.4 的规定。

I.1 一般要求

— 必须符合 4;1 的要求。

表 977-I

联合国编号和运输专用名称	每个包装件净数量	
	客机	货机
UN 3552 Sodium ion batteries packed with equipment 与设备包装在一起的钠离子电池	5 kg 钠离子电池芯或电池	35 kg 钠离子电池芯或电池

I.2 补充要求

- 必须保护电池芯和电池防止短路。这包括防止在同一包装内与导电材料接触，导致发生短路。
- 电池芯和电池必须：
 - 放入能将电池芯或电池完全封装的内包装内，然后再放入下列类别所示、满足 II 类包装性能要求的包装，然后与设备一起放入坚固的硬质外包装当中；或
 - 放入能将电池芯或电池完全封装的内包装内，然后与设备一起放入下列类别所示、满足 II 级包装的性能要求的包装内。
- 设备必须在外包装内得到固定以免移动。
- 每个包装件中的电池芯或电池的数量不得超过设备运行所需的数量，外加两组备用电池芯或电池。— “组” 电池芯或电池为驱动每件设备所需的单个电池芯或电池的数量。
- 2025 年 12 月 31 日之后生产的电池必须在外壳上标明瓦时额定值。

包装说明 977**I.3 外包装**

箱	桶	方桶
铝 (4B)	铝 (1B2)	铝 (3B2)
纤维板 (4G)	纤维 (1G)	塑料 (3H2)
天然木 (4C1, 4C2)	其他金属 (1N2)	钢 (3A2)
其他金属 (4N)	塑料 (1H2)	
塑料 (4H1, 4H2)	胶合板 (1D)	
胶合板 (4D)	钢 (1A2)	
再生木 (4F)		
钢 (4A)		

II. 第 II 节

与设备包装在一起的电池芯和电池，如满足本包装说明第 II 节中要求，则仅需遵守本细则中的如下补充规定：

- 第 1 部分 2.3 (概论 — 危险物品的邮寄运输)；
- 第 5 部分 2.4.16 (托运人的责任 — 锂电池或钠离子电池的特殊标记要求)；
- 第 7 部分 4.4 (运营人的责任 — 危险物品事故和事故征候的报告)；
- 第 7 部分 4.5 (运营人的责任 — 报告未申报的和错误申报的危险物品)；和
- 本包装说明第 1 段和第 2 段。

可以交运电池芯和电池，条件是每个电池芯和电池都满足 2.9.4 a)、e) 和 f) 的规定以及以下条件：

- 1) 电池芯的瓦时额定值 (见附录 2 的术语汇编) 不超过 20 Wh；
- 2) 电池的瓦时额定值不超过 100 Wh；
 - 必须在电池盒外壳上标明瓦时额定值，但在 2026 年 1 月 1 日之前制造的电池除外。

II.1 一般要求**表 977-II**

内装物	包装件数量 (第 II 节)	
	客机	货机
每个包装件内电池芯或电池的净量	5 kg	5 kg

包装说明 977

II.2 补充要求

- 电池芯和电池必须：
 - 放入能将电池芯或电池完全封装的内包装内，然后再放入符合 4;1.1.1、1.1.3.1 和 1.1.10（但 1.1.10.1 除外）规定的坚固的硬质外包装当中；或
 - 放入能将电池芯或电池完全封装的内包装内，然后与设备一起放入符合 4;1.1.1、1.1.3.1 和 1.1.10（但 1.1.10.1 除外）规定的坚固的硬质外包装当中。
- 必须保护电池芯和电池，以防发生短路。这包括防止在同一包装内与导电材料接触，导致发生短路。
- 设备必须在外包装内得到固定以免移动。
- 每个包装件内的电池芯或电池数目不得超过设备运行所需的数量，外加两组备用电池芯或电池。一“组”电池芯或电池为驱动每件设备所需的单个电池芯或电池的数量。
- 每个电池芯或电池包装件，或完成包装件，都必须能够承受从任何方向进行的 1.2 米跌落试验，而不会发生下列情况：
 - 使其中所装的电池芯或电池受损；
 - 内装物移动，以致电池与电池（或电池芯与电池芯）互相接触；
 - 内装物释出。
- 每个包装件必须贴有电池标记（图 5-3）。
 - 包装件的大小必须使得有足够空间在某一侧粘贴标记，且标记不会出现折叠。
- 如果使用航空货运单，则必须在航空货运单上写上“sodium ion batteries, in compliance with Section II of PI977”（钠离子电池，符合 PI977 第 II 节）的字样。如果一个航空货运单上包含可满足多个包装说明第 II 节要求的电池的包装件，不同电池类型和/或包装说明的合规声明可以合并为一个单一声明，前提是该声明注明适用的电池类型和包装说明编号。
- 如果包装件既含有装在设备中、也含有与设备包装在一起、符合第 II 节锂电池芯或电池限制的锂电池，则适用以下补充要求：
 - 托运人必须确保符合两项包装说明的所有适用部分。任何包装件中含有的电池的总质量不得超过 5 千克；
 - 如果使用航空货运单，则必须在航空货运单上写上“sodium ion batteries, in compliance with Section II of PI977”（钠离子电池，符合 PI977 第 II 节）的字样。
- 为电池芯或电池进行运输准备或将其交付运输的任何人员，必须接受与其责任相符的关于这些要求的适当指示。

II.3 外包装

箱	桶	方桶
铝	铝	铝
纤维板	纤维	塑料
天然木	其他金属	钢
其他金属	塑料	
塑料	胶合板	
胶合板	钢	
再生木		
钢		

II.4 合成包装件

- 当包装件放在合成包装件内时：
- a) 这些包装件必须牢靠地装在合成包装件内；
 - b) 合成包装件不得影响每个包装件应有的功能；和
 - c) 本包装说明所要求的电池标记（图 5-3）必须清楚可见，或将标记印在合成包装件外面，而且合成包装件必须标有字高应至少为 12 毫米的“Overpack”（合成包装件）的字样。

包装说明 978

仅限于 UN 3552（装在设备中）的客机和仅限货机运输

1. 引言

本条目适用于装在设备中的钠离子电池。

本包装说明第 I 节适用于划入第 9 类的钠离子电池芯和电池。某些交运的满足本包装说明第 II 节要求的钠离子电池芯和电池，在受下面第 2 段规定限制的条件下，不受本细则其他补充要求的限制。

联合国《试验和标准手册》第 III 部分 38.3.2.3 小节中定义的一个单电池芯电池被视为一个“电池芯”，必须根据本包装说明中针对“电池芯”的要求加以运输。

就本包装说明而言，“设备”系指由电池芯或电池提供运行电力的装置。

2. 禁止运输的电池

以下规定适用于本包装说明内所有电池芯和电池：

禁止运输按照特殊规定 A154 查明为已经受损或具有缺陷的电池芯或电池。

I. 第 I 节

每个电池芯或电池必须满足 2;9.4 的规定。

I.1 一般要求

设备必须装在符合第 4;1.1.1, 1.1.3.1 和 1.1.10（但 1.1.10.1 除外）的坚固的硬质外包装当中。对于大型设备，如果该设备对其所装的电池芯或电池提供了等效保护，则可不需包装或可放在货板上交付运输。

表 978-I

联合国编号和运输专用名称	每个包装件净数量	
	客机	货机
UN 3552 Sodium ion batteries contained in equipment 装在设备中的钠离子电池	5 kg 钠离子电池芯或电池	35 kg 钠离子电池芯或电池

I.2 补充要求

- 设备必须在外包装内得到固定以免移动，必须配备防止发生意外启动的有效装置。
- 当多件设备装在同一个外包装中时，每件设备必须包装好，以防止与其他设备接触。
- 2025 年 12 月 31 日之后生产的电池必须在外壳上标明瓦时额定值。

包装说明 978

I.3 外包装

箱	桶	方桶
铝	铝	铝
纤维板	纤维	塑料
天然木	其他金属	钢
其他金属	塑料	
塑料	胶合板	
胶合板	钢	
再生木		
钢		

II. 第 II 节

装在设备中的电池芯和电池，如满足本包装说明第 II 节中要求，则仅需遵守本细则中的如下补充规定：

- 第 1 部分 2.3（概论 — 危险物品的邮寄运输）；
- 第 5 部分 2.4.16（托运人的责任 — 锂电池或钠离子电池的特殊标记要求）；
- 第 7 部分 4.4（运营人的责任 — 危险物品事故和事故征候的报告）；
- 第 7 部分 4.5（运营人的责任 — 报告未申报的和错误申报的危险物品）；和
- 本包装说明第 1 段和第 2 段。

可以交运电池芯和电池，条件是每个电池芯和电池都满足 2;9.4 a)、e) 和 f) 的规定以及以下条件：

- 1) 电池芯的瓦时额定值（见附录 2 的术语汇编）不超过 20 Wh；
- 2) 电池的瓦时额定值不超过 100 Wh；
 - 必须在电池盒外壳上标明瓦时额定值，但在 2026 年 1 月 1 日之前制造的电池除外。

射频识别（RFID）标签、手表和温度记录仪等无法产生危险热量的装置，在故意激活状态下可以运输。这些装置在激活状态下，必须满足规定的电磁辐射标准，确保装置的运行不会对航空器系统产生干扰。必须确保运输途中该装置不会发出干扰信号（如蜂鸣警报、灯光闪烁等）。

II.1 一般要求

设备必须装在符合 4;1.1.1, 1.1.3.1 和 1.1.10（但 1.1.10.1 除外）规定的坚固的硬质外包装当中。对于大型设备，如果该设备对其所装的电池芯或电池提供了等效保护，则可不需包装或可放在货板上交付运输。

表 978-II

内装物	包装件数量（第 II 节）	
	客机	货机
每个包装件内电池芯或电池的净量	5 kg	5 kg

包装说明 978

II.2 补充要求

- 设备必须在外包装内得到固定以免移动，并配备防止发生意外启动的有效装置。
- 必须保护电池芯和电池防止短路。
- 当多件设备装在同一个外包装中时，每件设备必须包装好，以防止与其他设备接触。
- 每个包装件都必须贴有电池标记（图 5-3）。包装件的大小必须使得有足够空间在某一侧粘贴标记，且标记不会出现折叠。
 - 下列情况下，此项要求不适用：
 - 包装件仅含有装在设备（包括线路板）中的纽扣式电池；和
 - 在托运货物中的包装件数不超过两件的情况下，包装件所盛装的装在设备中的电池芯或电池分别不超过四个和两个。
- 如果托运货物中包含标有电池标记（图 5-3）的包装件，则在使用航空货运单时，货运单上必须写明“sodium ion batteries, in compliance with Section II of PI978”（钠离子电池，符合 PI 978 第 II 节）的字样。如果一个航空货运单上包含可满足多个包装说明第 II 节要求的钠离子电池的包装件，不同电池类型和/或包装说明的合规声明可以合并为一个单一声明，前提是该声明注明适用的钠离子电池类型和包装说明编号。
- 为电池芯或电池进行运输准备或将其交付运输的任何人员，必须接受与其负责的职能相符的关于这些要求的适当指示。

II.3 外包装

箱	桶	方桶
铝	铝	铝
纤维板	纤维	塑料
天然木	其他金属	钢
其他金属	塑料	
塑料	胶合板	
胶合板	钢	
再生木		
钢		

II.4 合成包装件

当包装件放在合成包装件内时：

- a) 这些包装件必须牢靠地装在合成包装件内；
- b) 合成包装件不得影响每个包装件应有的功能；和
- c) 本包装说明所要求的电池标记（图 5-3）必须清楚可见，或将标记印在合成包装件外面，而且合成包装件必须标有字高应至少为 12 毫米的“Overpack”（合成包装件）的字样。

为与联合国协调一致的修订

和

对电池规定的修订

DGP/29-WP/3 号文件第 4.1.2.1.6 段：

第 5 部分

托运人的责任

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第 2 章

标记

.....

2.4 标记的规格和要求

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《联合国规章范本》第 5.2 章 5.2.1.9（见 ST/SG/AC.10/50/Add.1）和第 1.2.15.1 a) 段：

2.4.16 锂电池或钠离子电池的特殊标记要求

2.4.16.1 根据包装说明 966、967、969 或 970、977 或 978 第 II 节和包装说明 965 和 968 第 IB 节进行包装的装有锂电池芯或电池或钠离子电池芯或电池的包装件，必须按图 5-3 所示进行标记。

2.4.16.2 标记必须标明适当的联合国编号，前面加上字母“UN”，如下所示：

- a) “UN 3090” — 锂金属电池芯或电池；
- b) “UN 3480” — 锂离子电池芯或电池；
- c) “UN 3091” — 装在设备中或与设备一起包装在一起的锂金属电池芯或电池；或
- d) “UN 3481” — 装在设备中或与设备一起包装在一起的锂离子电池芯或电池；或
- e) “UN 3552” — 装在设备中或与设备包装在一起的钠离子电池芯或电池。

如包装件中装有不同联合国编号的锂电池芯或电池，必须用一个或多个标记标明所有适用的联合国编号。

2.4.16.3 标记必须为长方形或正方形，边缘为阴影线。符号（一组电池，其中一个已经损坏且在冒火焰，下面是锂离子或、锂金属或钠离子电池芯或电池的联合国编号）必须为黑色白底，或者具有适当的反差背景。影线必须为红色。标记的尺寸必须至少为 100 毫米宽×100 毫米高，影线的宽度必须至少为 5 毫米。如果因包装件大小的需要，尺寸可减小，但不得小于 100 毫米宽×70 毫米高。在未明确规定尺寸的情况下，所有要素都必须与全尺寸标记中所示保持合适比例（图 5-3）。

2.4.16.4 符合包装说明 965 或 968 第 IB 节要求的锂电池包装件，必须同时贴有锂电池标记（图 5-3）和锂电池或钠离子电池第 9 类危险性标签（图 5-26）。

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《联合国规章范本》第 5.2 章，图 5.2.5（见 ST/SG/AC.10/50/Add.1）和第 1.2.15.1 b) 段：



* 在此填写联合国编号

图 5-3 锂电池标记

第 3 章

标签

3.5 标签规格

3.5.1 类别危险性标签的规格

3.5.1.1 标签必须满足本节的规定，并在颜色、符号和一般格式方面符合图 5-4 至图 5-26 所示的标签样本。

注：在适当情况下，图 5-4 至图 5-26 中的标签按照 3.5.1.1 a) 的规定显示虚线外边界线。如果在反衬颜色背景上使用标签，则不作要求。

类别危险性标签必须符合以下规格：

《联合国规章范本》第 3.2 章危险物品表（见 ST/SG/AC.10/50/Add.1）和本报告第 1.2.15.1 a) 段：

- c) 除了第 1 类 1.4、1.5 和 1.6 项的标签以外，标签上半部分必须包括形象符号，下半部分必须包括类别号码，或者在第 5 类标签的情况下，酌情包括项别号码。但是，对于第 9 类锂电池或钠离子电池标签（图 5-26），标签上半部分必须只包含符号的七条竖直条纹，下半部分必须包含该符号的电池组和类别号码。除了第 9 类锂电池或钠离子电池标签（图 5-26）外，标签可包括的文字如联合国编号或者根据 3.5.1.1 e) 说明危险类别的词（如“易燃”），但文字不得遮盖或妨碍看到其他必需的标签要素。
- d) 此外，除了 1.4、1.5 和 1.6 项，第 1 类物质或物品的标签必须在下半部分，在类别号码之上，显示项别号码和配装组字母。1.4、1.5 和 1.6 项的标签必须在上半部分显示项别号码，下半部分显示类别号码和配装组字母。
- e) 在除第 7 类材料以外的标签上，在图案下方插入任何类别或项别号或配装组以外的文字，必须限于说明危险性和需采取的操作注意事项的特定内容。如果是第 9 类锂电池或钠离子电池芯和电池（图 5-26），在标签的底部只能加上类别号。

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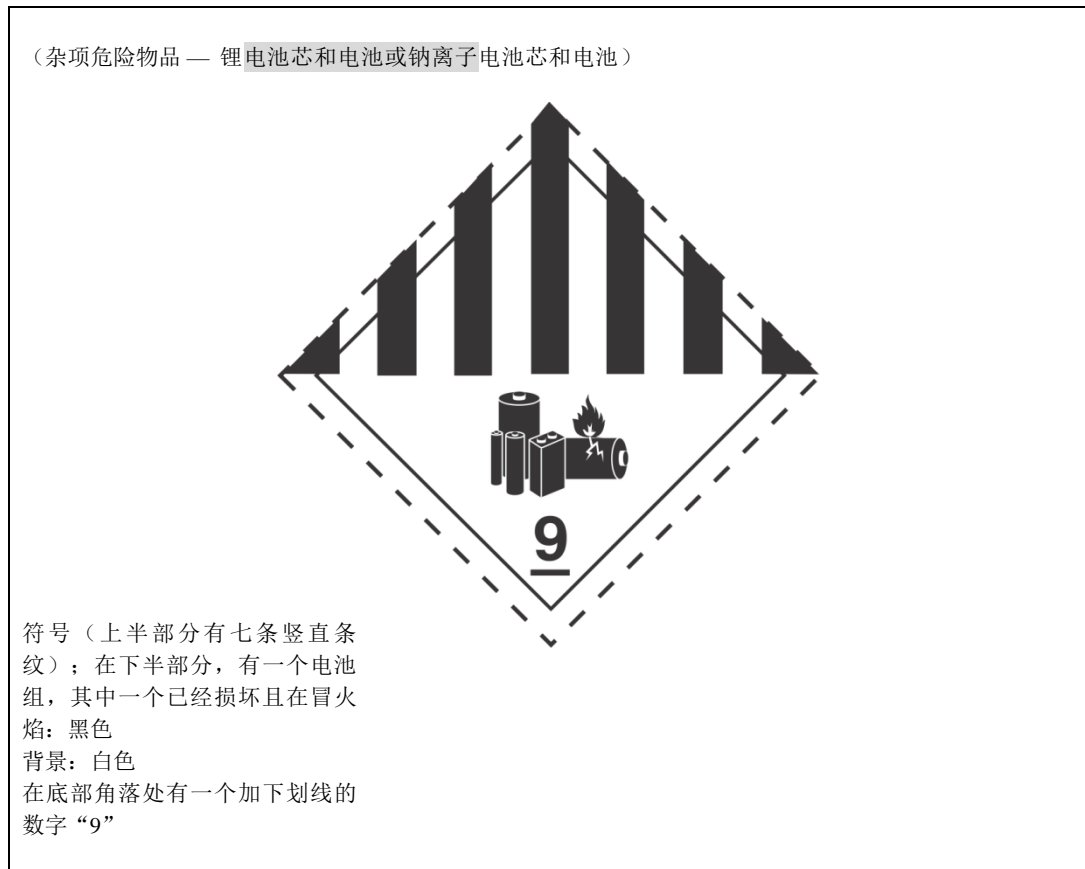


图 5-26 杂项危险物品 — 锂电池或钠离子电池，第 9 类

第 4 章

文件

.....

4.1.4 危险物品运输文件上要求的资料

4.1.4.1 危险物品说明

危险物品运输文件必须载有关于交运的每一危险物质、材料或物品的下列资料：

- a) 带有“UN”或“ID”字母前缀的联合国编号或识别号；
- b) 按照 3；1.2 确定的运输专用名称，酌情包括括号中的技术名称（参见 3；1.2.7）；
- c) 物品的主要危险性类别或划入的项别，包括第 1 类物品的配装组字母。“类”或“项”等字可以写在主要危险性类号或项号之前；
- d) 与要求采用的次要危险性标签相符的划定的次要危险性类号或项号，必须写在主要危险性类别或项别之后，并且放入括号内。“类”或“项”等字可以写在次要危险性类号或项号之前；
- e) 划定的物质或物品包装等级，可以前加“PG”（例如“PG II”）。

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为了运输便利化或国家监督而进行修订

和

对电池规定的修订

DGP/29-WP/3 号文件第 4.1.2.1.6.1 段：

注：在 2025 年 3 月 31 日之前，托运人可以根据本细则 2023-2024 年版所示的 UN 3171 — 电池供电车辆，确定锂电池供电的车辆。根据要求，所适用的标记和标签必须与危险物品运输文件上显示的信息一致。

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为管理航空特定风险进行的修订

本报告第 2.2.5 段：

4.1.5.7 放射性物质

4.1.5.7.1 每票第 7 类物质的托运货物必须按所给定的顺序列入适用的下列资料：

- a) 每种放射性核素的名称或符号，或者，对于放射性核素混合物，适当的一般性说明或限制最严的核素清单；

注：使用表 2-13 时，请参阅 5;4.1.5.8.1 g) 以了解危险物品运输文件所需的附加信息。

- b) 放射性物质的物理状态和化学形态的说明，或者表明该物质是特殊形式放射性物质或低弥散放射性物质的一种符号。关于化学形态，一般的化学描述是可以接受的；

注：对于 2;7.2.4.1.1.7 注规定的 B (U) 型或 B (M) 型空包装件，必须包括屏蔽材料放射性核素的名称或符号以及物理和化学形态（例如，贫化铀、固体、金属氧化物），在这种情况下，所标明的放射性核素可能和包装设计证书批准的放射性核素不同。

- c) 以贝克勒尔 (Bq) 为单位连同适当的国际单位制词头符号（见 1;3.2）表示的放射性内装物在运输期间的最大放射性活度。对于易裂变材料，可用以克 (g) 或其适当倍数为单位表示的易裂变材料质量（或在相应情况下，混合物的每一种易裂变核素的质量），代替放射性活度；
- d) 按 1.2.3.1.4 分配的包装件及有关外包装件和货物集装箱的放射性等级，即 I 级 — 白、II 级 — 黄、III 级 — 黄；
- e) 按 1.2.3.1.1 和 1.2.3.1.2 确定的运输指数（I 级 — 白除外）；
- f) 仅适用于 II 级 — 黄和 III 级 — 黄：包括每个包装件的尺寸单位在内的尺寸，或当放置在合成包装件或货物专用箱中时，合成包装件或货物专用箱的尺寸（如适用）。尺寸应按以下顺序显示：长 x 宽（或直径，如适用）x 高。“L（长）”、“W（宽）”（或“D（直径）”）、“H（高）”可在紧邻其各自尺寸之前标出。当采用不同顺序时，必须相应地显示字母“L”、“W”（或“D”）和“H”；
- fg) 对于易裂变材料：
 - 1) 如果是按照 2;7.2.3.5.1 a) 至 f) 所述的例外情况进行托运，参考该段；
 - 2) 如果是按照 2;7.2.3.5.1 c) 至 e) 进行托运，易裂变核素的总质量；
 - 3) 如果是包含在 6;7.10.2 a) 至 c) 其中之一或 6;7.10.3 规定之下的包装件内，参考该段；和
 - 4) 临界安全指数（如适用）。
- gh) 适用于托运货物的各类主管当局批准证书（特殊形式放射性物质、低弥散放射性物质、按照 2;7.2.3.5.1 fg) 被列为例外的易裂变材料、特殊安排、包装件设计或装运的批准证书）的识别标记；
- hi) 对于一个以上包装件的托运货物，必须提供每一包装件有关 4.1.4.1 a) 至 c) 和 4.1.5.7.1 a) 至 gh) 所载的资料。对于装在合成包装件或货物专用箱内的包装件，必须详细说明合成包装件或货物专用箱内每个包装件的内装物，并视情况详细说明每个合成包装件或货物专用箱的内装物。若打算在某一中途卸货点从合成包装件或货物集装箱卸出包装件，则必须提供相应的运输文件；
- ij) 在托运货物需按独家使用方式发运时，注明“EXCLUSIVE USE SHIPMENT”（独家使用装运）字样；和
- jk) 对于 LSA-II、LSA-III、SCO-I 和 SCO-II，以 A₂ 倍数表示的托运货物总放射性活度。对 A₂ 值无限制的放射性物质，A₂ 的这种倍数须为零。

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为管理航空特定风险进行的修订

DGP/29-WP/3 号文件第 4.2.2.3 段：

4.4 危险物品运输资料的保留

4.4.1 托运人必须保留一份危险物品运输文件，以及本细则规定的补充资料 and 文件至少三个月，并根据要求提供给国家主管当局。

4.4.2 如文件以电子方式保留或存在电脑系统中，托运人应能将其打印复制出来。

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为与联合国协调一致的修订

DGP/29-WP/3 号文件第 4.1.2.1.7 段：

第 6 部分

包装术语、标记、要求和试验

.....

第 2 章

除内包装外的包装标记

.....

《联合国规章范本》第 6.1 章，6.1.3.1（参见 ST/SG/AC.10/50/Add.1）

2.1 除内包装之外的包装标记要求

2.1.1 每个拟根据本细则使用的包装必须在不可移动的组件上带有耐久、易辨认和位置合适并且与包装相比大小适当的明显标记。对于毛重超过 30 kg 的包装件，其标记或复制标记必须标在包装的顶部或一侧。字母、数字和符号的高度至少为 12 mm；容量为 30 L 或更少或最大净重为 30 kg 的包装，其标记的字母、数字和符号的高度至少为 6 mm；容量为 5 L 或更少或最大净重为 5 kg 的包装，其标记的字母、数字和符号也必须有适当的尺寸。

注：本细则 2023-2024 年版第 2.1.1 的规定可继续适用至 2026 年 12 月 31 日。2027 年 1 月 1 日之前按制造之日时适用的规定制造的包装可继续使用。

标记必须包括：

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第 3 章

包装要求

3.1 除内包装之外的包装要求

一般要求

.....

3.1.1 钢桶

1A1 小口

1A2 大口

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《联合国规章范本》第 6.1 章，6.1.4.1.4（参见 ST/SG/AC.10/50/Add.1）

3.1.1.4 ~~容量大于 60 L 的钢桶桶身，通常至少装有两个扩张式滚箍，或者两个分开式滚箍。~~桶可有滚箍，扩张式或分开式均可。如装有分开式滚箍时，则须紧固在桶身上，不会发生移位。滚箍不可点焊。

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3.1.2 铝桶

1B1 小口

1B2 大口

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《联合国规章范本》第 6.1 章，6.1.4.2.3（参见 ST/SG/AC.10/50/Add.1）

3.1.2.3 ~~容量大于 60 L 的钢桶桶身，通常至少装有两个扩张式滚箍，或者两个分开式滚箍。~~桶可有滚箍，扩张式或分开式均可。如装有分开式滚箍时，则须紧固在桶体上，不会发生移位。滚箍不可点焊。

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《联合国规章范本》，第 6.1 章，6.1.4.3.3（参见 ST/SG/AC.10/50/Add.1）

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3.1.3 铝或钢以外的金属桶

1N1 小口

1N2 大口

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3.1.3.3 ~~容量大于 60 L 的钢桶桶身，通常至少装有两个扩张式滚箍，或者两个分开式滚箍。~~桶可有滚箍，扩张式或分开式均可。如装有分开式滚箍时，须紧固在桶体上，不会发生移位。滚箍不可点焊。

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《联合国规章范本》第 6.1 章，6.1.4.12（参见 ST/SG/AC.10/50/Add.1）

3.1.11 纤维板箱（包括瓦楞纸板箱）

4G

3.1.11.1 须使用与箱子的容量和用途相适应、坚固优质的实心或双面波纹纤维板（单层或多层）。外表面的抗水性须是：当使用科布（Cobb）法确定吸水性时，在 30 分钟的试验期内，质量增加值不大于 155 g/m^2 — 见 ISO 535:1991/2014。纤维板须有适当的弯曲强度，在切割、压折时无裂缝，并须开槽，以便装配时不会裂开、表面破裂或者不应有的弯曲。波纹纤维板的槽部须牢固地胶合在面板上。

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第 4 章

包装性能试验

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4.5 内压（液压）试验

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4.5.3 试验方法和施加的压力：金属包装包括其封盖须承受 5 分钟的试验压力。塑料包装和复合包装（塑料）包括其封盖须承受 30 分钟的试验压力。这一压力为 2.1.1 d) 要求的标记中所示。包装的支撑方式不得使试验无效。所使用的试验压力必须连续且均匀，并在试验的全过程中保持恒定。使用的水压（表压），按下列任一方法确定，必须是：

为便利运输或国家监督所作出的修订

DGP/29-WP/2 号文件第 4.3.6 段：

- a) 不小于 55°C 时测出的包装内的总表压（即盛装物质的蒸气压和空气或其他惰性气体的分压减去 100 kPa ）乘以安全系数 1.5；这一总表压须按照 4.1.1.5 要求的最大填充度以及 15°C 的填充温度来确定。试验压力不得低于 95 kPa （要求 III 级包装第 3 类、或 6.1 项或第 9 类液体物质，压力不低于 75 kPa ）；或

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为与联合国协调一致的修订

第 5 章

气瓶和密闭式低温容器、气溶胶喷雾器、
小型气体容器（蓄气筒）和装有液化易燃气体的
燃料电池盒的构造和试验要求

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5.1 一般要求

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5.1.5 初次检查和试验

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5.1.5.2 密闭式低温容器在制造期间和之后必须按照适用的设计标准或公认的技术规范进行试验和检查，包括下列试验和检查：

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DGP/29-WP/3 号文件第 4.1.2.1.7 段：

《联合国规章范本》第 6.2 章，6.2.1.5.2（参见 ST/SG/AC.10/50/Add.1）

对所有已完成的密闭式低温压力容器：

- q) 测试防漏性。

注：按照本细则 2021-2022 年版中适用的 5.1.5.2 首次检查和试验要求制造的封闭式低温容器，但不符合本细则 2023-2024 年版中适用的 5.1.5.2 与首次检查和试验有关的要求的，可继续使用。

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5.1.6 定期检查和试验

5.1.6.1 密闭式低温容器之外的可再充装气瓶必须由经国家有关当局授权的单位按如下要求进行定期检查和试验：

- a) 检查气瓶的外部状况，核实设备和外部标记；
- b) 检查气瓶内部状况（如内部检查、最小壁厚检验）；
- c) 检查螺纹是否有下述现象之一：
 - i) 存在腐蚀迹象；或
 - ii) 封闭装置或其他辅助设备被移除；
- d) 进行气瓶壳体液压试验，如有必要，通过适当试验核实材料性能。

注 1：经国家有关当局同意，只要不发生任何危险，可以用气压试验代替液压试验。

《联合国规章范本》，第 6.2 章，6.2.1.6.1 (d) (参见 ST/SG/AC.10/50/Add.1)

注 2: 对于无缝钢气瓶壳体和圆筒, 5.1.6.1 b) 所述的检查和 5.1.6.1 d) 所述的液压试验可替换为 ISO 16148:2016 + Amd 1:2020 “气瓶 — 可再充装无缝钢气瓶和圆筒 — 声波发射检查 (AT) 以及定期检查和试验的后续超声波检查 (UT) ”。

注 3: 5.1.6.1 b) 中的内部状况检查和 5.1.6.1 d) 中的液压试验可由超声波检查替代, 无缝钢和无缝铝合金气瓶壳体按 ISO 18119:2018 + Amd 1:2021 进行。在 2026 年 12 月 31 日之前的过渡期内, 可继续为此目的使用 ISO 18119:2018 标准。在 2024 年 12 月 31 日之前的过渡期内, 无缝铝合金气瓶可采用 ISO 10461:2005 + Amd 1:2006 标准, 无缝钢气瓶壳体可采用 ISO 6406:2005 标准, 以达到同样的目的。

e) 如重新投入使用, 应检查辅助设备。这项检查可以与气瓶壳体的检查分开进行。

注: 有关定期检查及试验的间隔, 见包装说明 200, 如是加压化学品则见包装说明 218。

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5.2 对联合国气瓶和密闭式低温容器的要求

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5.2.1 设计、制造和初次检查及试验

5.2.1.1 以下标准适用于可再充装联合国气瓶壳体的设计、制造和初次检查及试验, 但是与合格评定系统和核准有关的检查要求必须符合 5.2.5 的规定:

《联合国规章范本》第 6.2 章, 6.2.2.1.1 和 6.2.2.1.2 (参见 ST/SG/AC.10/50/Add.1)

参考	标题	适用的制造日期
ISO 9809-1:1999	气瓶 — 可再充装的无缝钢瓶 — 设计、制造和试验 — 第 1 部分: 张力强度小于 1 100 MPa 的淬火和回火钢瓶。 注: 本标准 7.3 节中关于 F 因数的注释不得用于联合国气瓶。	至 2018 年 12 月 31 日
ISO 9809-1:2010	气瓶 — 可再充装的无缝钢瓶 — 设计、制造和试验 — 第 1 部分: 张力强度小于 1 100 MPa 的淬火和回火钢瓶。	至 2026 年 12 月 31 日
ISO 9809-1:2019	气瓶 — 可再充装的无缝钢瓶和筒的设计、制造和试验 — 第 1 部分: 张力强度小于 1 100 MPa 的淬火和回火钢瓶和筒。	至进一步通知
ISO 9809-2:2000	气瓶 — 可再充装的无缝钢瓶 — 设计、制造和试验 — 第 2 部分: 张力强度大于或等于 1 100 MPa 的淬火和回火钢瓶。	至 2018 年 12 月 31 日
ISO 9809-2:2010	气瓶 — 可再充装的无缝钢瓶 — 设计、制造和试验 — 第 2 部分: 张力强度大于或等于 1 100 MPa 的淬火和回火钢瓶。	至 2026 年 12 月 31 日
ISO 9809-2:2019	气瓶 — 可再充装的无缝钢瓶和筒的设计、制造和试验 — 第 2 部分: 张力强度大于或等于 1 100 MPa 的淬火和回火钢瓶和筒。	至进一步通知
ISO 9809-3:2000	气瓶 — 可再充装的无缝钢瓶 — 设计、制造和试验 — 第 3 部分: 正火钢瓶。	至 2018 年 12 月 31 日
ISO 9809-3:2010	气瓶 — 可再充装的无缝钢瓶 — 设计、制造和试验 — 第 3 部分: 正火钢瓶。	至 2026 年 12 月 31 日
ISO 9809-3:2019	气瓶 — 可再充装的无缝钢瓶和筒的设计、制造和试验 — 第 3 部分: 正火钢瓶和筒。	至进一步通知
ISO 9809-4:2014	气瓶 — 可再充装钢质无缝气瓶 — 设计、制造和试验 — 第 4 部分: 不锈钢气缸 小于 4 100 兆帕的真空 拉伸强度小于 1 100 兆帕的不锈钢气瓶	至进一步通知 至 2028 年 12 月 31 日

参考	标题	适用的制造日期
ISO 9809-4:2021	气瓶 — 可再充装的无缝钢气瓶和气筒的设计、制造和试验 — 第 4 部分：拉伸强度小于 1 100 兆帕的不锈钢气瓶 注：少量指一批不超过 200 个气瓶。	至进一步通知
ISO 7866:1999	气瓶 — 可再充装的无缝铝合金气瓶 — 设计、制造和试验。 注：此标准 7.2 节中的关于 F 因数的注释不得用于联合国气瓶。不得核准使用铝合金 6351A-T6 或等同材料。	至 2020 年 12 月 31 日
ISO 7866:2012+ Cor 1:2014	气瓶 — 可再充装的铝合金无缝气瓶 — 设计、制造和试验 注：不得使用铝合金 6351A 或相当材料。	至进一步通知
ISO 4706:2008	气瓶 — 可再充装焊接钢气瓶 — 试验压力 60 巴及以下	至进一步通知
ISO 18172-1:2007	气瓶 — 可再充装焊接无缝钢气瓶 — 第 1 部分：试验压力 6 兆帕及以下	至进一步通知
ISO 20703:2006	气瓶 — 可再充装焊接铝合金气瓶 — 设计、制造和试验	至进一步通知
ISO 11119-1:2002	复合结构的气瓶 — 规格和试验方法 — 第 1 部分：加有箍套的复合气瓶。	至 2020 年 12 月 31 日
ISO 11119-1:2012	气瓶 — 可再充装的复合气瓶和管 — 设计、制造和测试 — 第 1 部分：容量不超过 450 升环向缠绕纤维增强复合气瓶和管。	至进一步通知 至 2028 年 12 月 31 日
ISO 11119-1:2020	气瓶 — 可再充装的复合气瓶和气筒的设计、制造和试验 — 第 1 部分：450 升以下环向缠绕纤维增强型复合气瓶和气筒。	至进一步通知
ISO 11119-2:2002	复合结构的气瓶 — 规格和试验方法 — 第 2 部分：带有均分负载金属衬里，由全包纤维增强的复合气瓶。	至 2020 年 12 月 31 日
ISO 11119-2:2012 + Amd 1:2014	气瓶 — 可再充装的复合气瓶和管 — 设计、制造和试验 — 第 2 部分：容量不超过 450 升完全包裹纤维增强带负载分配金属衬里的复合气瓶。	至进一步通知 至 2028 年 12 月 31 日
ISO 11119-2:2020	气瓶 — 可再充装的复合气瓶和气筒的设计、制造和试验 — 第 2 部分：带负荷分配金属衬里的 450 升以下完全缠绕纤维增强型复合气瓶和气筒。	至进一步通知
ISO 11119-3:2002	复合结构的气瓶 — 规格和试验方法 — 第 3 部分：带有非均分负载金属衬里或非金属衬里，由全包纤维增强的复合气瓶。 注：本标准不得用于由两个相互连接部件制造的无衬套气瓶。	至 2020 年 12 月 31 日
ISO 11119-3:2013	气瓶 — 可再充装的复合气瓶和管 — 设计、制造和试验 — 第 3 部分：容量不超过 450 升完全包裹纤维增强带不分配负载金属或非金属衬里的复合气瓶。 注：本标准不得用于由两个相互连接部件制造的无衬套气瓶。	至进一步通知 至 2028 年 12 月 31 日
《联合国规章范本》第 6.2 章，6.2.2.1.1 和 6.2.2.1.2（见 ST/SG/AC.10/50/Add.1）和本报告第 1.2.1.6 段：		
ISO 11119-3:2020	气瓶 — 可再充装的复合气瓶和气筒的设计、制造和试验 — 第 3 部分：带非负荷分配金属或非金属衬里或不带衬里的 450 升以下完全缠绕纤维增强型复合气瓶和气筒。	至进一步通知
ISO 11119-4: 2016	气瓶 — 可再充装的复合气瓶 — 设计、制造和测试 — 第 4 部分：容量不超过 150 升带负载分配金属焊接衬里的完全包裹纤维增强复合气瓶。	至进一步通知

注 1：在上述标准中，复合气瓶壳体的使用寿命不应少于 15 年。

注 2：设计寿命在 15 年以上的复合气瓶壳体，在生产日期满 15 年后不得继续充装，除非设计已通过使用寿命试验方案。方案应为最初设计类型批准的一部分，并应明确规定检查和试验，表明按规定制造的复合气瓶壳体在设计寿命日期前始终是安全的。使用寿命试验方案和结果，应得到负责最初批准气瓶设计的批准国主管部门的批准。复合气瓶壳体的使用寿命不得超出最初批准的设计寿命。

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《联合国规章范本》第 6.2 章，6.2.2.1.4（见 ST/SG/AC.10/50/Add.1）和本报告第 1.2.1.6 段：

5.2.1.4 下列标准适用于联合国密闭式低温容器的设计、构造和初次检查及试验，但是与合格评定系统和核准有关的检查要求必须符合 5.2.5：

参考	标题	适用的制造日期
ISO 21029-1:2004	低温容器 — 体积不超过 1000L 的可运输的真空绝热容器 — 第 1 部分：设计、制造、检查和试验。	至 2026 年 12 月 31 日
ISO 21029-1:2018 + Amd.1 Amd 1:2019	低温容器 — 体积不超过 1 000 L 的可运输的真空绝热容器 — 第 1 部分：设计、制造、检查和试验	至进一步通知

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《联合国规章范本》第 6.2 章，6.2.2.1.9（见 ST/SG/AC.10/50/Add.1）

5.2.1.9 下列标准适用于不可再充装的联合国气瓶的设计、制造及首次检查和试验，但有关合格评估制度的检查要求和批准，必须按 6;5.2.5 进行。

参考	标题	适用的制造日期
ISO 11118:1999	气瓶 — 不可再充装的金属气瓶 — 规格和试验方法。	至 2020 年 12 月 31 日
ISO 13340:2001	可运输的气瓶 — 不可再充装的气瓶使用的气瓶阀门 — 规格和样品试验。	至 2020 年 12 月 31 日
ISO 11118:2015	气瓶 — 不可再充装的金属气瓶 — 规格和试验方法。	至 2026 年 12 月 31 日
ISO 11118:2015 + Amd.1 Amd 1:2019	气瓶 — 不可再充装的金属气瓶 — 规格和试验方法。	至进一步通知

5.2.2 材料

除了设计和制造标准所规定的材料要求，以及拟运气体的适用包装说明（如包装说明 200、包装说明 202 或包装说明 214）规定的任何限制，以下标准也适用于材料的兼容性：

《联合国规章范本》第 6.2 章，6.2.2.2（参见 ST/SG/AC.10/50/Add.1）

参考	标题	适用的制造日期
ISO 11114-1:2012 +A1:2017-11114- 1:2020	气瓶 — 瓶以及阀的材料与内装气体的兼容性 — 第 1 部分：金属材料。	至进一步通知
ISO 11114-2:2013 11114-2:2021	气瓶 — 瓶以及阀的材料与内装气体的兼容性 — 第 2 部分：非金属材料。	至进一步通知

5.2.3 封闭装置及其保护

以下标准适用于封闭装置的设计、制造及首次检查和试验及其保护：

《联合国规章范本》第 6.2 章，6.2.2.3（参见 ST/SG/AC.10/50/Add.1）

参考	标题	适用的制造日期
ISO 11117:1998	气瓶 — 工业和医用气瓶的阀门保护罩和阀门保护装置 — 设计、制造和试验。	至 2014 年 12 月 31 日
ISO 11117:2008 + Cor 1:2009	气瓶 — 阀门保护罩和阀门保护装置 — 设计、制造和试验。	至 2026 年 12 月 31 日
ISO 11117:2019	气瓶 — 阀门保护罩和保护装置 — 设计、制造和试验。	至进一步通知
ISO 10297:1999	气瓶 — 可再充装气瓶的阀门 — 规格和类型试验。	至 2008 年 12 月 31 日
ISO 10297:2006	气瓶 — 可再充装气瓶的阀门 — 规格和类型试验。	至 2020 年 12 月 31 日
ISO 10297:2014	气瓶 — 气瓶阀 — 规格和类型试验	至 2022 年 12 月 31 日
ISO 10297:2014 + Amd 1:2017	气瓶 — 气瓶阀门 — 规格和型号试验	至进一步通知
ISO 14246:2014	气瓶 — 气瓶阀门 — 制造试验和检查	2024 年 12 月 31 日
ISO 14246:2014 + Amd 1:2017	气瓶 — 气瓶阀门 — 制造试验和检查	至进一步通知
ISO 17871:2015	气瓶 — 速释气瓶阀门 — 规格和型号试验 注：本标准不得适用于易燃气体。	至 2026 年 12 月 31 日
ISO 17871:2020	气瓶 — 速释气瓶阀门 — 规格和型号试验。	至进一步通知
ISO 17879:2017	气瓶 — 气瓶自闭阀门 — 规格和型号测试 注：本标准不得适用于乙炔气瓶中的自闭阀门。	至进一步通知
ISO 23826:2021	气瓶 — 球阀 — 规格和试验	至进一步通知

对联合国金属氢贮存系统，下列标准规定的要求适用于系统的封盖及保护：

参考	标题	适用的制造日期
ISO 16111:2008	可运输的气体贮存装置 — 可逆性金属氢化物吸收的氢。	至 2026 年 12 月 31 日
ISO 16111:2018	可运输的气体贮存装置 — 可逆性金属氢化物吸收的氢。	至进一步通知

5.2.4 定期检查和试验

5.2.4.1 以下标准适用于联合国气瓶的定期检查和试验：

《联合国规章范本》，第 6.2 章，6.2.2.4（参见 ST/SG/AC.10/50/Add.1）

参考	标题	适用的制造日期
ISO 6406:2005	无缝钢气瓶 — 定期检查和试验。	至 2024 年 12 月 31 日
ISO 18119:2018	气瓶 — 无缝钢及无缝铝合金气瓶和筒 — 定期检查和试验。	至进一步通知至 2026 年 12 月 31 日
ISO 18119:2018 + Amd 1:2021	气瓶 — 无缝钢及无缝铝合金气瓶和筒 — 定期检查和试验	至进一步通知
ISO 10460:2005	气瓶 — 焊接碳钢气瓶 — 定期检查和试验。 注：不得进行该标准第 12.1 条款所述的焊接修理。若要进行第 12.2 条款所述的修理，则必须根据 5.2.6，经批准定期检查和试验单位的国家有关当局予以批准方能进行。	至 2024 年 12 月 31 日
ISO 10460:2018	气瓶 — 焊接铝合金、碳和不锈钢气瓶 — 定期检查和试验。	至进一步通知
ISO 10461:2005 + Amd 1:2006	无缝铝合金气瓶 — 定期检查和试验。	至 2024 年 12 月 31 日
ISO 10462:2013	气瓶 — 乙炔罐 — 定期检查和保养	至 2024 年 12 月 31 日

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5.2.7 联合国可再充气瓶和密闭式低温容器的标记

5.2.7.2 必须使用如下认证标记：

.....

《联合国规章范本》第 6.2 章，6.2.2.7.3（参见 ST/SG/AC.10/50/Add.1）

- l) 对于盛装 UN 3374 Acetylene, solvent free（乙炔，无溶剂）的气瓶：
- i) 以千克为单位的皮重包括空瓶壳体、充装过程中未去除的辅助设备（包括多孔材料）和任何涂层的质量总和，用四舍五入至最后一位数的三位有效数字表示，后加字母“KG”。小数点后应该至少有一位数字。少于 1 千克的气瓶，质量应该用四舍五入至最后一位数的两位有效数字表示；
 - ii) 多孔材料的识别标记（例如名称或商标）；和
 - iii) 已充装的乙炔气瓶总质量（以千克为单位），后加字母“KG”。

注：按照本细则 2021-2022 年版制造的乙炔气瓶，如果没有按照本细则 2023-2024 年版中适用的 6.5.2.7.2 (k) 或 (l) 进行标记，可继续使用，直到本细则本版本生效两年后的下一次定期检查和试验，届时必须按照上述规定进行标记或停止使用。

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5.2.7.4 必须使用如下制造标记：

.....

《联合国规章范本》第 6.2 章，6.2.2.7.4 (p)（参见 ST/SG/AC.10/50/Add.1）

- p) 准备装运气体的钢气瓶和密闭式低温容器，以及钢内衬的复合气瓶和密闭式低温容器，如果有氢脆变的危险性，就要用字母“H”来表示钢的兼容性（参见 ISO 11114-1:2012:2020）。

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5.2.9 联合国金属氢贮存系统的标记

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5.2.9.2 必须使用下列标记:

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《联合国规章范本》第 6.2 章, 6.2.2.9.2 (j) (参见 ST/SG/AC.10/50/Add.1)

j) 如果是钢气瓶和带钢衬里的复合气瓶, 字母“H”表示钢的相容性 (见 ISO 11114-1: ~~2012~~2020); 和

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5.2.11 可再充装的联合国气瓶和密闭式低温容器封闭装置的标记

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《联合国规章范本》第 6.2 章, 6.2.2.11 (参见 ST/SG/AC.10/50/Add.1)

5.2.11.2 当阀门的试验压力小于阀门充装接头额定值所示试验压力时, 必须予以标记。

注: 2027 年 1 月 1 日之前按照本细则 2021-2022 年版中适用的要求制造的可再充装气瓶的封闭装置, 如果没有按照本细则 2023-2024 年版中适用的 5.2.11 的要求进行标记, 可继续使用。

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第 7 部分

运营人的责任

对电池规定的修订

DGP/29-WP/3 号文件第 4.4.1.9 段和本报告第 3.1 段：

第 2 章

仓储和装载

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2.13 根据第 8 部分之规定载运的电池驱动代步工具的装载

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2.13.3 锂离子电池驱动的代步工具的装载

2.13.3.1 运营人必须通过使用绑带、系留索或其他约束装置牢靠地固定装有电池的电池驱动代步工具。必须保护代步工具、电池、电线和操纵装置免受损坏，包括由行李、邮件或货物移动造成的损坏。

2.13.3.2 运营人必须核实：

- a) 是否对电池的电极进行了保护，防止其短路（如通过将其密封在电池箱内）；
- b) 电池是否：
 - 1) 由代步工具的设计提供充分保护以免受到损坏并牢固地安装在代步工具上。必须按照制造商的指示对电路进行绝缘处理；或
 - 2) 按照制造商的指示从代步工具上拆下；和
- c) 拆下的每一电池不超过 300 Wh。最多可携带一个不超过 300 Wh 的备用电池或两个各不超过 160 Wh 的备用电池。

注：当锂电池一直安装在代步工具中时，没有瓦时限制。

2.13.3.3 运营人必须确保从代步工具上拆下的任何电池和任何备用电池在客舱中携带，并防止损坏（例如将每块电池放入一个保护袋中），且保护电池的电极防止其短路（例如在暴露的电极上贴胶带使其绝缘）。

2.13.3.4 运营人必须告知机长任何安装有锂离子电池的代步工具、拆下的电池和备用电池的位置。

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第 4 章

通报情况

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本报告第 2.2.6 段:

4.5 关于未申报或错误申报的危险物品的报告

4.5.1 当在货物或邮件中发现未申报或错误申报的危险物品时，对于任何这样的事件，运营人必须向运营人所在国和事件发生现场所在国的有关当局报告。

4.5.2 当运营人或发现危险物品的机构告知运营人在行李中或旅客或机组人员身上发现了根据 8; 1.1.1 不允许的危险物品时，运营人~~也~~必须向事件发生现场所在国的有关当局报告。

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第 8 部分

有关旅客和机组成员的规定

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第 1 章

本报告第 2.2.1.2 段:

旅客或机组成员携带危险物品的规定

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1.1 旅客或机组成员携带的危险物品

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1.1.1 旅客或机组成员禁止携带危险物品，不论该危险物品是作为随身行李还是放在随身行李中，也不论是作为交运行李还是放在交运行李中，或者随身携带，除非该危险物品：

- a) 根据表 8-1 允许携带；和
- b) 仅供个人使用。

注 1: 在其他运输方式中，旅客通常可以携带以下危险物品，但是，它们不得作为随身行李或放在随身行李中，也不得作为交运行李或放在交运行李中或者随身携带：

- a) 含有液态氧的个人医用氧气装置；
- b) 含有诸如爆炸品、压缩气体、锂电池等危险物品的电击武器（例如泰瑟枪）；
- c) 摩擦火柴；
- d) 打火机燃料和打火机充气储筒；
- e) 没有防止意外启动保护装置的预混燃烧打火机（见附录 2 的术语汇编）；和
- f) 没有安全帽或防止意外启动保护装置的、由锂离子或锂金属电池供电的电池动力打火机（例如激光等离子打火机、特斯拉线圈打火机、助熔打火机、电弧打火机和双电弧打火机）。

注 2: 本细则所列的例外情况不在表 8-1 中重新列出。以下危险物品不受本细则的约束：

- 作为治疗结果在人体内含有的放射性药物；和
- 供个人或家庭使用的装在零售包装内的节能灯具。（见 1;2.6）

注 3: 各国可以实施符合航空安保利益的额外限制。

1.1.2 除了 7:4.4 和 7:4.5 的报告规定外，本细则的规定不适用于表 8-1 中允许的符合以下情况的危险物品：

- a) 由旅客或机组成员携带，仅供个人使用；

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DGP/29-WP/2 号文件第 4.2.2.4 段和本报告第 2.2.1 段:

- b) 放在转运过程中已与物主分离的行李（如丢失行李或错运行李等处理不当的行李）中；或

.....

1.1.9 除了 7;4.4 和 7;4.5 的报告规定外，本细则的规定不适用于表 8-2 中允许的符合以下情况的危险物品:

- a) 由禁止化学武器组织的工作人员因公旅行时携带或由表 8-2 所列政府机构工作人员因公旅行时携带;

为管理航空特定风险的修订

DGP/29-WP/2 号文件第 4.2.2.4 段和本报告第 2.2.1 段:

- b) 放在转运过程中已与物主分离的行李（如丢失行李或错运行李等处理不当的行李）中；或

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本报告第 2.2.1.2 段：

表 8-1 关于旅客或和机组成员携带的危险物品的规定

危险物品	位置		需经运营人批准	限制
	交运行李	随身行李		
电池				
1) 锂电池（包括便携式电子装置）	是 (g)和 h)除外)	是	(见 c)和 d))	<p>.....</p> <p>本报告第 2.2.1.1 段和第 4.4 段：</p> <p>e) 装有电池的便携式电子装置内含的电池应作为随身行李携带；但是，如果作为交运行李交运，则：</p> <ul style="list-style-type: none"> - 必须采取措施防止意外启动并保护装置不受损坏；和 - 装置应作为随身行李携带；但是， <p>如果作为托运行李交运，装置必须完全关闭（不在睡眠或休眠模式），倘若电池超过：</p> <ul style="list-style-type: none"> - 对于锂金属电池，每个装置锂含量 0.3 克；或 - 对于锂离子电池，每个装置瓦时额定值 2.7 Wh； <p>.....</p>
4) 由以下电池驱动代步工具（如轮椅）： — 非防漏型电池； — 防漏型湿电池； — 干电池； — 镍金属氢化物电池；或 — 锂离子电池	是	(见 e))	是	<p>a) 供由于身患残疾、健康或年龄问题或暂时性的行动困难（如腿断了）而行动不便的旅客使用；</p> <p>b) 旅客应当提前与每一运营人做好安排，并提供所安装电池的型号信息和代步工具的操作信息（包括如何使电池绝缘的指示）；</p> <p>c) 如果是干电池或镍金属氢化物电池，每个电池必须分别符合特殊规定 A123 或 A199。</p>

危险物品	位置		需经运营人批准	限制
	交运行李	随身行李		
				<p>d) 如果是防漏型湿电池：</p> <p>i) 每一电池必须符合特殊规定 A67；和</p> <p>ii) 每位旅客最多可以携带一个备用电池。</p> <p>e) 如果是锂离子电池：</p> <p>i) 每一电池类型必须符合联合国《试验和标准手册》第 III 部分第 38.3 小节规定的每项试验的要求；</p> <p>ii) 当代步工具未对电池提供充分保护时：</p> <ul style="list-style-type: none"> — 必须遵循制造商的指示将电池卸下； — 电池不得超过 300 Wh； — 必须保护电池两极以防止短路（使电极绝缘，例如在暴露的电极上贴胶带）； — 必须保护电池免受损坏（例如将每个电池放入一个保护袋中）；和 — 电池必须在客舱中携带； <p>iii) 最多可携带一个不超过 300Wh 的备用电池，或两个各不超过 160 Wh 的备用电池。备用电池必须在客舱中携带。</p> <p>DGP-WP/23 报告第 4.4.1.9 段和本报告第 2.2.1.1 段：</p> <p>注：当锂电池（一个或多个）仍安装在代步工具内时，无瓦时限制。</p>

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1.1.10 ~~有源~~已激活装置必须符合电磁辐射的规定标准，以确保这些器件的操作不会干扰航空器系统。

~~注 1: 在其他运输方式中，旅客通常可以携带以下危险物品，但是，它们不得作为随身行李或放在随身行李中，也不得作为交运行李或放在交运行李中:~~

- ~~a) 含有液态氧的个人医用氧气装置;~~
- ~~b) 含有诸如爆炸品、压缩气体、锂电池等危险物品的电击武器 (例如泰瑟枪);~~
- ~~e) 摩擦火柴;~~
- ~~d) 打火机燃料和打火机充气储筒;~~
- ~~e) 没有防止意外启动保护装置的预混燃烧打火机 (见附录 2 的术语汇编); 和~~
- ~~f) 没有安全帽或防止意外启动保护装置的、由锂离子或锂金属电池供电的电池动力打火机 (例如激光等离子打火机、特斯拉线圈打火机、助熔打火机、电弧打火机和双电弧打火机)。~~

~~注 2: 本细则所列的例外情况不在表 8-1 中重新列出。以下危险物品不受本细则的约束:~~

- ~~——作为治疗结果在人体内含有的放射性药物; 和~~
- ~~——供个人或家庭使用的装在零售包装内的节能灯具。(见 1;2.6)~~

~~注 3: 各国可以实施符合航空安保利益的额外限制。~~

为与联合国保持一致而进行修订

DGP/29-WP/3 号文件第 4.1.2.1.8 段：

附录 2

术语汇编

.....

术语汇编

术语和解释

相关联合国编号

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《联合国规章范本》第 3.2 章，危险物品表（见 ST/SG/AC.10/50/Add.1）：

Batteries, containing metallic sodium or sodium alloy. 含钠金属或钠合金电池 由含钠金属或钠合金的一系列电池芯组成，完全紧固于一金属壳内以防止在正常运输条件下危险物品泄露的制品。尽管其设计目的用于产生电能，但这些电池具有电子惰性，在任何温度下电池中的钠金属或钠合金都处于固态。 3292

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Cells, containing metallic sodium or sodium alloy. 含钠金属或钠合金电池芯 由全封闭金属外壳组成，将危险物品全部封装其中以防止在正常运输条件下危险品泄漏的制品。除了钠金属或钠合金以外，本条目下的这些电池芯还可能含有硫磺，而无其他危险物品。设计意图虽为产生电能，但这些电池芯在任何温度下都表现为电子惰性，其中所含的钠金属或钠合金处于固体状态。 3292

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《联合国规章范本》，附录 B（见 ST/SG/AC.10/50/Add.1）：

Fire suppressant dispersing devices. 灭火剂散布装置 是含有烟火物质的物品，其目的是在启动时散布灭火剂（或气溶胶），并且不含有任何其他危险物品。 0514, 3559

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报告附录 B

根据议程项目 1 对《技术细则补篇》的综合修订

第 S-3 部分

危险物品表、特殊规定和数量限制

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注：对《技术细则》表 3-1 的修改将通过出版流程自动反映在《补篇》的相关信息项中。此处显示的危险物品表条目是那些与表 3-1 中数值有差异的信息项。

第 3 章

危险物品增补表

类别 2

表 S-3-1. 危险物品增补表（类 2）

名称	UN 编号	类别或项别	次要危险性	标签	国家差异条款	特殊规定	UN 包装等级	例外数量	客机和货机		仅限于货机	
									包装说明	每个包装件最大净量	包装说明	每个包装件最大净量
1	2	3	4	5	6	7	8	9	10	11	12	13

为与联合国保持一致而进行修订

DGP/29-WP/3 号文件第 4.1.3.1 段：

《联合国规章范本》第 3.2 章，危险物品表（见 ST/SG/AC.10/50/Add.1）和本报告第 1.3.1.2 段：

Disilane 乙硅烷	3553	2.1						E0	FORBIDDEN 禁运		FORBIDDEN 禁运	
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第 4 章

危险物品增补表

第 3 至 9 类

表 S-3-1. 危险物品增补表（第 3 至 9 类）

名称	UN 编号	类别或项别	次要危险性	标签	国家差异条款	特殊规定	UN 包装等级	例外数量	客机和货机		仅限于货机	
									包装说明	每个包装件最大净量	包装说明	每个包装件最大净量
1	2	3	4	5	6	7	8	9	10	11	12	13

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为与联合国保持一致而进行修订

DGP/29-WP/3 号文件第 4.1.3.1 段和本报告第 1.3.1 段：

《联合国规章范本》第 3.2 章，危险物品表（见 ST/SG/AC.10/50/Add.1）：

Sodium ion batteries with organic electrolyte 含有机电解质的钠离子电池	3551	9		Miscellaneous — Lithium or sodium ion batteries 杂项 — 锂或钠离子 子电池		A88 A99 A154 A164 A183 A227 A228 A331 A334		E0	FORBIDDEN 禁运		See 976 见 976	
Trifluoromethyltetrazole sodium salt in acetone with not less than 68% acetone, by mass 三氟甲基四氮唑钠盐的丙酮溶液，按质量含丙酮不低于 68%	3555	3		Liquid flammable 易燃液体		A40	II	E0	FORBIDDEN 禁运		FORBIDDEN 禁运	

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第 6 章

特殊规定

表 S-3-4 特殊规定

对电池规定的修订

A331 锂离子或钠离子电池芯或电池，如果其荷电状态超过其标称额定容量的 30%，在获得了始发国和运营人所在国主管当局的批准后，并根据这些主管当局制定的书面条件，方可仅限于在货机上运输。在考虑给予批准时至少应考虑下列标准，以在电池芯、电池或包装件一级缓解装有锂离子或钠离子电池芯或电池的包装件发生过热、冒烟或失火事件所带来的风险：

A334 a) 在其他运输形式（包括货机运输）不可行的情况下，经始发国、运营人所属国和目的地国主管当局根据其制定的书面条件预先批准，锂电池芯或电池或钠离子电池芯或电池可以在客机上运输，前提是每个包装件的数量不超过：

1) 对于锂金属电池芯或电池：

- i) 最多 2 个电池，每个电池的锂含量大于 0.3 克但不超过 2 克；或
- ii) 最多 8 个电池芯，每个电池芯的锂含量大于 0.3 克但不超过 1 克；或
- iii) 最多 2.5 公斤电池芯和/或电池，每个电池芯或电池的锂含量不超过 0.3 克；或

2) 对于锂离子或钠离子电池芯或电池：

- i) 最多 2 个电池，每个电池的瓦时（Wh）额定值大于 2.7 瓦时但不超过 100 瓦时；或
- ii) 最多 8 个电池芯，每个电池芯的瓦时额定值大于 2.7 瓦时但不超过 20 瓦时；或
- iii) 最多 2.5 公斤电池芯和/或电池，每个电池芯或电池的瓦时额定值不超过 2.7 瓦时。

b) 在考虑给予批准时至少应虑及下列标准，以缓解包装件内在电池芯、电池或包装件层面由于锂电池芯或电池或钠离子电池芯或电池发热、冒烟或起火事件所带来的风险：

- 1) 包装件外不允许存在任何量的火焰；
- 2) 包装件外表面温度不得超过可点燃邻近包装材料或导致邻近包装件内电池或电池芯发生热逸散失控的温度值；
- 3) 不得从包装件内掉出碎片，包装件必须保持结构完好；
- 4) 散发的易燃蒸气量必须低于下述气体量：在该气体与空气混合且点燃时，可造成一个能使航空器货舱内过压板移位或造成航空器货舱衬板损坏的压力脉冲；和
- 5) 当包装件或合成包装件受到外部火烧（例如五分钟燃油器火焰穿透性阻燃试验）或高温环境（例如烘箱热阻试验）时，锂电池芯或电池或钠离子电池芯或电池热散逸失控造成的所有危险效应都必须控制在包装件之内。

关于上述标准（b）1）至 5）的适当信息和文件，必须根据要求提供给签发批准的国家主管当局。

第 S-4 部分

包装说明

（《技术细则》第 4 部分的补充内容）

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第 4 章

第 2 类 — 气体

为与联合国保持一致而进行修订

DGP/29-WP/3 号文件第 4.1.3.1 段：

《联合国规章范本》第 3.2 章，危险物品表（见 ST/SG/AC.10/50/Add.1）：

包装说明 200

气瓶必须符合 4;1.1 和 4;4.1.1 的一般包装要求。

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表 2 液化气体和溶解气体

UN 编号	名称	类或项	次要危险性	LC ₅₀ ml/m ³	气瓶	试验周期,年	试验压力巴	充装比	特殊包装规定
.....									
1032	Dimethylamine, anhydrous 无水二甲胺	2.1			X	10	10	0.59	b
1033	Dimethyl ether 二甲醚	2.1			X	10	18	0.58	
3553	Disilane 乙硅烷	2.1			X	10	225	0.39	q
1035	Ethane 乙烷	2.1			X	10	95 120 300	0.25 0.30 0.40	

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第 6 章

第 4 类 — 易燃固体；易于自燃的物质；
遇水放出易燃气体的物质

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为与联合国保持一致而进行修订

DGP/29-WP/3 号文件第 4.1.3.1 段：

DGP/29-WP/2 号文件第 4.1.2.1.1 b) 段：

包装说明 451

客机 and 货机运输 — 湿爆炸物 (I 级包装)

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组合包装					单一包装
联合国编号和运输专用名称	内包装 (见 6.3.2)	(每个容器) 内包装数量	每个包装件 总量 — 客机	每个包装件 总量 — 货机	
.....					
UN 3474 1-Hydroxybenzotriazole, anhydrous, wetted monohydrate 羟基苯丙三唑, 无水的, 湿的 单一水合物	玻璃 塑料	0.5 kg	0.5 kg	0.5 kg	否

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第 11 章

第 9 类 — 杂项危险品

为与联合国保持一致而进行修订

DGP/29-WP/3 号文件第 4.1.3.1 段：

《联合国规章范本》第 4.1 章 4.1.4.1，第 910 页（见 ST/SG/AC.10/50/Add.1）

包装说明 910

仅限货机运输

引言

本条包装说明适用于年生产量不超过 100 个电池芯或电池的联合国编号为 3090、3091、3480 和 3481、3551 和 3552 的电池芯或电池，并适用于出于试验目的予以运输的生产之前的电池芯或电池原型。

一般要求：

必须满足《技术细则》第 4 部分第 1 章中的要求。

锂离子电池芯和电池和钠离子电池芯和电池（UN 3480 和 UN 3551），包括与设备一起包装或装在设备内的（UN 3481 和 UN 3552），必须在荷电状态不超过其额定容量 30% 的情况下交运，除非始发国和运营人所属国具体批准某一较高荷电状态。

补充包装要求

- 包装，包括大型包装，必须满足 I 级包装的性能要求；
- 电池芯和电池必须采取防短路的保护措施。防短路的保护措施包括但不限于：
 - 对电池电极进行单独保护；
 - 采用防止电池芯和电池相互接触的内包装；
 - 电池设计使用凹陷电极，以防发生短路，或
 - 使用不导电和不可燃的衬垫材料，填满包装中电池芯或电池之间的空隙。

电池芯和电池，包括与设备一起包装时：

- 1) 不同大小、形状或质量的电池和电池芯，包括设备，必须包装在这样一个外包装内，该外包装采用下文所列的经过试验的设计类型，且包装件的总质量不得超过该设计类型接受实验时所能承受的总质量。对于单个电池，包括与设备一起包装的，允许使用以下所示的硬质大型包装；
- 2) 每个电池芯或电池必须单独包装在内包装内，然后放入一个外包装内；
- 3) 每个内包装必须用足够的不可燃和不导电的热绝缘材料完全包裹，防止生产热而造成危险的热量释放；
- 4) 必须采取适当措施，最大程度减少震动和撞击的影响，防止运输过程电池芯或电池在包装内移动，从而带来损坏和危险情况。可使用不可燃和不导电的衬垫材料满足这项要求；
- 5) 应必须根据包装的设计或制造国承认的某项标准对热绝缘材料和衬垫材料的不燃性做出评估；
- 6) 净质量超过 30 千克的电池芯或电池，每个外包装只限装一个。

包装说明 910

装在设备上的电池芯和电池:

- 1) 不同大小、形状或质量的设备必须包装在这样一个外包装内, 该外包装采用下文所列的经过试验的设计类型, 且包装件的总质量不得超过该设计类型接受实验时所能承受的总质量。装有电池芯或电池的单个设备允许使用下面所示的硬质大型包装;
- 2) 设备的构造或包装必须能够防止在运输过程中意外启动;
- 3) 必须采取适当措施, 最大程度减小震动和撞击的影响, 防止运输过程设备在包装内移动, 从而带来损坏和危险情况。如果使用衬垫材料来满足这项要求, 它必须不可燃且不导电; 和
- 4) 应必须根据包装的设计或制造国承认的某项标准对热绝缘材料和衬垫材料的不燃性做出评估。

不必遵守《技术细则》第 6 部分的包装

设备或电池可按照国家主管当局规定的条件, 包装在不必遵守《技术细则》第 6 部分要求的外包装或保护性封闭装置内。在批准过程中可考虑的额外条件包括但不限于:

- 1) 该设备或电池必须坚固到足以承受运输期间通常会遇到的冲击和负载, 包括在集装器之间及集装器与仓库之间的转运, 以及从托盘或集装器上卸下以便进行随后的人工或机械操作; 和
- 2) 设备或电池必须在支架、板条箱或其他操作设备中加以固定, 使其在正常运输期间不会松散。

注: 允许使用的包装净重可超过 400 千克 (见《技术细则》4;2.3)。

外包装

箱	桶	方桶
铝 (4B)	铝 (1B2)	铝 (3B2)
纤维板 (4G)	纤维 (1G)	塑料 (3H2)
天然木 (4C1, 4C2)	其他金属 (1N2)	钢 (3A2)
其他金属 (4N)	塑料 (1H2)	
胶合板 (4D)	胶合板 (1D)	
再生木 (4F)	钢 (1A2)	
塑料 (4H1, 4H2)		
钢 (4A)		

硬质大型包装

箱
铝 (50B)
纤维板 (50G)
天然木 (50C)
其他金属 (50N)
塑料 (50H)
胶合板 (50D)
再生木 (50F)
钢 (50A)

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对电池规定的修订

包装说明 974

仅限货机运输

引言

本包装说明在锂~~电~~电池芯或电池质量超过 35 kg 时适用于联合国编号 3090、3091、3480 ~~和~~ 3481、3551 和 3552。

一般要求

必须满足第 4 部分第 1 章中要求。

锂离子电池芯和电池和钠离子电池芯和电池（UN 3480 和 UN 3551），包括与设备一起包装或装在设备内的（UN 3481 和 UN 3552），必须在荷电状态不超过其额定容量 30% 的情况下交运，除非始发国和运营人所属国具体批准某一较高荷电状态。

每个电池芯或电池必须满足《技术细则》第 2 部分第 9.3 段中的规定。

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APPENDIX C
(English only)

**AMENDMENTS TO THE EMERGENCY RESPONSE GUIDANCE FOR
AIRCRAFT INCIDENTS INVOLVING DANGEROUS GOODS
RECOMMENDED UNDER AGENDAS ITEM 2 AND 9**

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Amendments to manage aviation specific risks

Paragraphs 9.1 and 2.4.1 of this report and paragraph 3.2.4.1 of DGP/28-WP/3:

Section 3

**EXAMPLES OF DANGEROUS GOODS
INCIDENT PROCEDURES**

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**3.3 CABIN CREW PROCEDURES FOR DANGEROUS GOODS INCIDENTS
IN THE PASSENGER CABIN DURING FLIGHT**

This section consists of cabin crew procedures for dangerous goods incidents in the passenger cabin during flight involving:

- a) battery / portable electronic device (PED) fire / smoke (see 3.3.1);
- b) overhead bin battery / portable electronic device (PED) fire / smoke (see 3.3.2);
- c) overheated battery / electrical smell involving a portable electronic device (PED) — no visible fire or smoke (see 3.3.3);
- d) PED ~~inadvertently crushed or damaged~~ fallen into / trapped in ~~electrically adjustable~~ a passenger seat (see 3.3.4);

e) battery / portable electronic device (PED) fire / smoke on the flight deck (see 3.3.5);

f) battery / portable electronic device (PED) fire / smoke when fire containment equipment is carried on board aircraft (see 3.3.6);

eg) fire involving dangerous goods (see 3.3.57); and

fh) spillage or leakage of dangerous goods (see 3.3.68)

Note. 1— Although this guidance material presents sequences of tasks, some of these actions occur simultaneously when carried out by crew members in a multi-cabin crew operation.

Note. 2— The operator should ensure its aircraft are equipped with appropriate firefighting and protective equipment for use by crew members.

Note. 3— In a single cabin crew member operation, some of the actions listed in this section should be carried out with the assistance of other persons (e.g. able-bodied passengers). The operating cabin crew member should assign those persons to communicate with the flight crew and provide back-up while the cabin crew member fights the fire.

Note. 4— Although this guidance refers to passenger PEDs, procedures are also applicable to crew member PEDs.

3.3.1 Battery / portable electronic device (PED) fire / smoke

Procedures for battery / portable electronic device (PED) fire / smoke	
Step	Cabin crew action
1.	<p>IDENTIFY THE ITEM</p> <p><i>Note.— It may not be possible to identify the item (source of fire) immediately. In this case, apply Step 2 first, and then attempt to identify it.</i></p> <p>Caution: In order to avoid injury from a flash fire, it is not recommended to open the affected baggage when there is any indication of smoke or flames.</p>
2.	<p>APPLY FIREFIGHTING PROCEDURE</p> <p>a) Obtain and use the appropriate fire extinguisher. b) Retrieve and use protective equipment, as applicable to the situation. c) Move passengers away from the area, if possible. d) Notify pilot-in-command / other cabin crew members.</p> <p><i>Note.— Actions should occur simultaneously in a multi-crew operation.</i></p>
3.	<p>REMOVE POWER</p> <p>a) Disconnect the device from the power supply, if safe to do so. b) Turn off in-seat power, if applicable. c) Verify that power to the remaining electrical outlets remains off, if applicable.</p> <p>Caution: Do not attempt to remove the battery from the device.</p>
4.	<p>DOUSE LEAVE THE DEVICE WITHIN ITS PLACE AND POUR WATER (OR OTHER NON-FLAMMABLE LIQUID) <u>ON THE DEVICE</u></p> <p><i>Note.— Liquid may turn to steam when applied to the hot battery.</i></p>

Procedures for battery / portable electronic device (PED) fire / smoke	
<i>Step</i>	<i>Cabin crew action</i>
5.	<p>LEAVE THE DEVICE IN ITS PLACE AND MONITOR FOR ANY INDICATION OF REIGNITION AND CONTINUE TO POUR WATER (OR OTHER NON-FLAMMABLE LIQUID) ON THE DEVICE</p> <p>a) If smoke or flames reappear, repeat Steps 2 and 4.</p> <p>Caution:</p> <p>— Do not attempt to pick up or move the device.</p> <p>— Do not cover or enclose the device.</p> <p>— Do not use ice or dry ice to cool the device.</p>
6.	<p>WHEN WAIT UNTIL THE DEVICE HAS COOLED (e.g. approximately 10 to 15 minutes)</p> <p>a) Obtain a suitable empty container.</p> <p>b) Fill the container with enough water (or other non-flammable liquid) to submerge the device.</p> <p>c) Using protective equipment, place the device in the container and completely submerge in water (or other non-flammable liquid).</p> <p>d) Stow and secure (if possible) the container to prevent spillage.</p>
<u>7.</u>	<u>OBTAIN A SUITABLE EMPTY CONTAINER</u>
<u>8.</u>	<u>FILL THE CONTAINER WITH ENOUGH WATER (OR OTHER NON-FLAMMABLE LIQUID) TO SUBMERGE THE DEVICE</u>
<u>9.</u>	<u>PLACE THE DEVICE IN THE CONTAINER AND COMPLETELY SUBMERGE IN WATER (OR OTHER NON-FLAMMABLE LIQUID), USING PROTECTIVE EQUIPMENT</u>
<u>10.</u>	<u>STOW AND SECURE (IF POSSIBLE) THE CONTAINER TO PREVENT SPILLAGE</u>
7 <u>11.</u>	MONITOR THE DEVICE AND THE SURROUNDING AREA FOR THE REMAINDER OF THE FLIGHT
8-12	<p><u>APPLY POST-INCIDENT PROCEDURES AFTER LANDING AT THE NEXT DESTINATION</u></p> <p>a) Apply operator's post-incident procedures.</p>

3.3.2 Overhead bin battery / portable electronic device (PED) fire / smoke

Procedures for overhead bin battery / portable electronic device (PED) fire / smoke	
Step	Cabin crew action
1.	<p>APPLY FIREFIGHTING PROCEDURE</p> <p>a) Obtain and use the appropriate fire extinguisher. b) Retrieve and use protective equipment, as applicable to the situation. c) Move passengers away from the area, if possible. d) Notify pilot-in-command / other cabin crew members.</p> <p><i>Note.</i>— Actions should occur simultaneously in a multi-crew operation.</p>
2.	<p>IDENTIFY THE ITEM</p> <p>If the device is visible and accessible, or, if the device is contained in baggage and flames are visible:</p> <p>a) Re-apply Step 1 to extinguish the flames, if applicable. b) Apply Steps 3 to 5.</p> <p>If smoke is coming from the overhead bin, but the device is not visible or accessible:</p> <p>c) Remove other baggage from the overhead bin to access the affected baggage/item. d) Identify the item. e) Apply Steps 3 to 5.</p> <p>Caution: In order to avoid injury from a flash fire, it is not recommended to open the affected baggage when there is any indication of smoke or flames.</p>
3.	<p>DOUSE<u>LEAVE</u> THE DEVICE (BAGGAGE) WITHIN ITS PLACE AND POUR WATER (OR OTHER NON-FLAMMABLE LIQUID) <u>ON THE DEVICE (BAGGAGE)</u></p> <p><i>Note.</i>— Liquid may turn to steam when applied to the hot battery.</p>
4.	<p><u>MONITOR FOR ANY INDICATION OF REIGNITION AND CONTINUE TO POUR WATER (OR OTHER NON-FLAMMABLE LIQUID) ON THE DEVICE</u></p>
45.	<p><u>WHEN</u><u>WAIT UNTIL</u> THE DEVICE HAS COOLED</p> <p>a) Obtain a suitable empty container. b) Fill the container with enough water (or other non-flammable liquid) to submerge the device. c) Using protective equipment, place the device in the container and completely submerge in water (or other non-flammable liquid). d) Stow and secure (if possible) the container to prevent spillage.</p>

Procedures for overhead bin battery / portable electronic device (PED) fire / smoke	
Step	Cabin crew action
6.	<u>OBTAIN A SUITABLE EMPTY CONTAINER</u>
7.	<u>FILL THE CONTAINER WITH ENOUGH WATER (OR OTHER NON-FLAMMABLE LIQUID) TO SUBMERGE THE DEVICE</u>
8.	<u>PLACE THE DEVICE IN THE CONTAINER AND COMPLETELY SUBMERGE IN WATER (OR OTHER NON-FLAMMABLE LIQUID), USING PROTECTIVE EQUIPMENT</u>
9.	<u>STOW AND SECURE (IF POSSIBLE) THE CONTAINER TO PREVENT SPILLAGE</u>
10.	MONITOR THE DEVICE AND THE SURROUNDING AREA FOR THE REMAINDER OF THE FLIGHT
11.	<u>APPLY POST-INCIDENT PROCEDURES</u> AFTER LANDING AT THE NEXT DESTINATION a) Apply operator's post-incident procedures.

3.3.3 Overheated battery / electrical smell involving a portable electronic device (PED) — no visible fire or smoke

Procedures for overheated battery / electrical smell involving a portable electronic device (PED) — no visible fire or smoke	
Step	Cabin crew action
1.	IDENTIFY THE ITEM
2.	INSTRUCT THE PASSENGER TO TURN OFF THE DEVICE IMMEDIATELY
3.	REMOVE POWER a) Disconnect the device from the power supply, if safe to do so. b) Turn off in-seat power, if applicable. c) Verify that power to the remaining electrical outlets remains off, if applicable. d) Verify that the device remains off for the remainder of the flight. Caution: Do not attempt to remove the battery from the device.

Procedures for overheated battery / electrical smell involving a portable electronic device (PED) — no visible fire or smoke	
<i>Step</i>	<i>Cabin crew action</i>
4.	<p>INSTRUCT THE PASSENGER TO KEEP THE DEVICE VISIBLE AND MONITOR CLOSELY</p> <p>Caution: Unstable batteries may ignite even after the device is turned off.</p>
5.	<p>IF SMOKE OR FLAMES APPEAR <u>APPLY PROCEDURES FOR</u></p> <p>a) Apply BATTERY / PED FIRE / SMOKE procedures (see 3.3.1). <u>IF SMOKE OR FLAMES APPEAR</u></p>
6.	<p><u>APPLY POST-INCIDENT PROCEDURES</u> AFTER LANDING AT THE NEXT DESTINATION</p> <p>a) Apply operator's post-incident procedures.</p>

3.3.4 PED ~~inadvertently crushed or damaged in electrically adjustable~~ fallen into / trapped in a passenger seat

Procedures for PED inadvertently crushed or damaged in electrically adjustable <u>fallen into / trapped in a passenger seat</u>	
<i>Step</i>	<i>Cabin crew action</i>
1.	NOTIFY THE PILOT-IN-COMMAND / OTHER CABIN CREW MEMBERS
21.	OBTAIN INFORMATION FROM THE PASSENGER, BY ASKING THE PASSENGER a) To identify the item. b) Where the passenger suspects that the item may have dropped or slipped into. c) If the seat was moved since misplacing the item.
32.	RETRIEVE AND USE PROTECTIVE EQUIPMENT, IF AVAILABLE
3.	NOTIFY THE PILOT-IN-COMMAND / OTHER CABIN CREW MEMBERS
4.	RETRIEVE THE ITEM <u>IF SAFE TO DO SO</u> Caution: Do not move the seat electrically or mechanically when attempting to retrieve the item.
5.	IF SMOKE OR FLAMES APPEAR <u>APPLY PROCEDURES FOR</u> a) Apply BATTERY / PED FIRE / SMOKE procedures (see 3.3.1). <u>IF SMOKE OR FLAMES APPEAR</u>
6.	MONITOR THE SEAT AND THE SURROUNDING AREA FOR THE REMAINDER OF THE FLIGHT
67.	APPLY POST-INCIDENT PROCEDURES <u>APPLY POST-INCIDENT PROCEDURES</u> AFTER LANDING AT THE NEXT DESTINATION a) Apply operator's post-incident procedures.

3.3.5 Battery / portable electronic device (PED) fire / smoke on the flight deck

<u>Procedures for battery / portable electronic device (PED) fire / smoke on the flight deck</u>	
<u>Step</u>	<u>Cabin crew action</u>
<u>1.</u>	<u>RECOGNIZE SIGNAL FOR FIRE / SMOKE ON THE FLIGHT DECK</u>
<u>2.</u>	<u>APPLY FIREFIGHTING PROCEDURE</u>
<u>3.</u>	<u>REMOVE THE DEVICE FROM THE FLIGHT DECK</u>
<u>4.</u>	<u>CLOSE THE FLIGHT DECK DOOR</u>
<u>5.</u>	<u>APPLY PROCEDURES FOR BATTERY / PED FIRE / SMOKE IF SMOKE OR FLAMES APPEAR</u>
<u>6.</u>	<u>APPLY POST-INCIDENT PROCEDURES AFTER LANDING AT THE NEXT DESTINATION</u>

3.3.6 Procedures for battery / portable electronic device (PED) fire / smoke when fire containment equipment is carried on board aircraft

Due to the quantity and diversity of existing fire containment products available to operators, it is not possible to design a procedure that encompasses all products. Therefore, this section provides overarching guidance for the use of such equipment. The operator should develop detailed procedures based on the original equipment manufacturer (OEM) instructions. If carried on board the aircraft, one of the fire containment equipment should be located in the flight deck. Additional fire containment should be carried in the cabin. They should be placed in a suitable location(s) that is easily accessible by the cabin crew. When operating multi-deck aircraft, the operator should assess the need for additional fire containment equipment on each deck. Cabin crew members should use the equipment following the OEM's instructions, which should be incorporated in the cabin crew operations manual (CCOM). Cabin crew members should be drilled and capable in the use of the specific fire containment equipment carried on board the operator's aircraft.

Note.— Fire containment equipment may not be suitable for all types of PEDs, due to size and shape.

3.3.57 Fire involving dangerous goods

Procedures for fire involving dangerous goods	
Step	Cabin crew action
1.	<p>IDENTIFY THE ITEM</p> <p><i>Note.— It may not be possible to identify the item (source of fire) immediately. In this case, apply Step 2 first, and then attempt to identify it.</i></p> <p>Caution: In order to avoid injury from a flash fire, it is not recommended to open the affected baggage when there is any indication of smoke or flames.</p>
2.	<p>APPLY FIREFIGHTING PROCEDURE</p> <p>a) Obtain and use the appropriate fire extinguisher / check use of water. b) Retrieve and use protective equipment, as applicable to the situation. c) Move passengers away from the area, if possible. d) Notify pilot-in-command / other cabin crew members.</p> <p><i>Note.— Actions should occur simultaneously in a multi-crew operation.</i></p>
3.	<p>MONITOR FOR ANY REIGNITION <u>INDICATION OF REIGNITION</u></p> <p>a) ———— If smoke/flames reappear, repeat Step 2.</p>
4.	<p>ONCE THE FIRE HAS BEEN EXTINGUISHED</p> <p>a) ———— Apply <u>APPLY PROCEDURES FOR SPILLAGE OR LEAKAGE OF DANGEROUS GOODS</u> procedures, if required (see 3.3.6), <u>IF REQUIRED, ONCE THE FIRE HAS BEEN EXTINGUISHED</u></p>
5.	<p><u>APPLY POST-INCIDENT PROCEDURES</u> AFTER LANDING AT THE NEXT DESTINATION</p> <p>a) ———— Apply operator's post-incident procedures.</p>

3.3.68 Spillage or leakage of dangerous goods

Procedures for spillage or leakage of dangerous goods	
Step	Cabin crew action
1.	NOTIFY THE PILOT-IN-COMMAND / OTHER CABIN CREW MEMBERS
2.	IDENTIFY THE ITEM
3.	COLLECT EMERGENCY RESPONSE KIT OR OTHER USEFUL ITEMS
4.	DON RUBBER GLOVES RETRIEVE AND SMOKE HOOD USE PROTECTIVE EQUIPMENT
5.	MOVE PASSENGERS AWAY FROM AREA AND DISTRIBUTE WET TOWELS OR CLOTHS
6.	PLACE DANGEROUS GOODS ITEM IN POLYETHYLENE BAGS
7.	STOW POLYETHYLENE BAGS
8.	TREAT AFFECTED SEAT CUSHIONS / COVERS IN THE SAME MANNER AS DANGEROUS GOODS ITEM
9.	COVER SPILLAGE ON CARPET / FLOOR
10.	REGULARLY INSPECT MONITOR ITEMS STOWED AWAY / CONTAMINATED FURNISHINGS
11.	<u>APPLY POST-INCIDENT PROCEDURES</u> AFTER LANDING AT THE NEXT DESTINATION a) ——— Apply operator's post-incident procedures.

3.4 AMPLIFIED CABIN CREW PROCEDURES FOR DANGEROUS GOODS INCIDENTS IN THE PASSENGER CABIN DURING FLIGHT

This section consists of amplified cabin crew procedures for dangerous goods incidents in the passenger cabin during flight involving:

- a) battery / portable electronic device (PED) fire / smoke (see 3.4.1);
- b) overhead bin battery / portable electronic device (PED) fire / smoke (see 3.4.2);
- c) overheated battery / electrical smell involving a portable electronic device (PED) — no visible fire or smoke (see 3.4.3);
- d) PED ~~inadvertently crushed or damaged~~ fallen into / trapped in ~~electrically adjustable~~ a passenger seat (see 3.4.4);

~~— e~~ e) battery / portable electronic device (PED) fire / smoke on the flight deck (see 3.4.5);

f) fire involving dangerous goods (see 3.4.~~56~~); and

~~f~~ g) spillage or leakage of dangerous goods (see 3.4.~~67~~).

~~— Note. — Although this guidance material presents sequences of tasks, some of these actions occur simultaneously when carried out by crew members.~~

3.4.1 Battery / portable electronic device (PED) fire / smoke

Amplified procedures for battery / portable electronic device (PED) fire / smoke	
<i>Step</i>	<i>Cabin crew action</i>
1.	<p>IDENTIFY THE ITEM</p> <p>It may not be possible <u>for cabin crew</u> to identify the item (source of fire <u>or smoke</u>) right away, especially if the fire has started in a seat pocket or the device is not readily accessible. In this case, <u>cabin crew should apply</u> firefighting procedures should be applied, as a first step. <u>(Step 2) and then attempt to identify the item (Step 1)</u>. If the item is contained in baggage, the crew's actions would be similar to the actions for a device that is visible or readily accessible.</p> <p>Caution: In order to avoid injury from a flash fire, it is not recommended to open the affected baggage when there is any indication of smoke or flames. However, in certain situations cabin crew members may assess and deem it necessary to slightly open baggage to allow entry of the extinguishing agent and non-flammable liquid. This should be done with extreme caution and only after donning appropriate protective equipment available on the aircraft.</p>
2.	<p>APPLY FIREFIGHTING PROCEDURE</p> <p><u>a) Apply communication procedures.</u> <u>b) Use appropriate firefighting equipment and protective equipment, as required.</u> <u>c) Fight fire.</u> <u>d) Manage passengers and cabin, as required.</u></p> <p><u>During any</u> occurrence concerning a fire in the cabin, <u>the cabin crew</u> should be notified immediately to <u>notify</u> the pilot-in-command who should be kept <u>immediately and keep the flight crew</u> informed of all actions taken and of the effect. It is essential that the cabin crew and the flight crew coordinate their actions and that each is kept fully informed of the other's actions and intentions. <u>Minimizing the spreading of smoke and fumes into the flight deck is critical for the continued safe operation of the aircraft, therefore it is essential to keep the flight deck door closed at all times. Crew communication and coordination are of utmost importance. The use of the interphone is the primary means of communication between crew members, unless the interphone system fails.</u></p> <p>Appropriate firefighting and emergency procedures must be used to deal with any fire. In a multi-cabin crew operation, the actions detailed in the firefighting procedure should be conducted simultaneously. On aircraft operated with only one cabin crew member, the aid of a passenger should be sought in dealing with the situation.</p> <p>Halon, Halon replacement or water extinguisher should be used to extinguish the fire and prevent its spread to additional flammable materials. It is important to wear available protective equipment (e.g. protective breathing equipment, fire gloves) when fighting a fire.</p>

Amplified procedures for battery / portable electronic device (PED) fire / smoke	
<i>Step</i>	<i>Cabin crew action</i>
	<p>If fire develops, cabin crew should take prompt action to move passengers away from the area involved and, if necessary, provide wet towels or cloths and give instructions for passengers to breathe through them. Minimizing the spreading of smoke and fumes into the flight deck is critical for the continued safe operation of the aircraft, therefore it is essential to keep the flight deck door closed at all times. Crew communication and coordination are of utmost importance. The use of the interphone is the primary means of communication unless the interphone system fails. Appropriate firefighting procedures should be used to deal with any fire. Cabin crew should use firefighting equipment to extinguish the fire and prevent its spread to additional flammable materials. It is important that cabin crew use protective equipment (e.g. protective breathing equipment, protective gloves) when fighting a fire.</p> <p>If fire develops, cabin crew should take prompt action to move passengers away from the area involved and, if necessary, provide wet towels or cloths and give instructions for passengers to breathe through them.</p> <p style="text-align: center;"><u>The following is moved from step 1:</u></p> <p>Caution: In order to avoid injury from a flash fire, it is not recommended to open the affected baggage when there is any indication of smoke or flames. However, in certain firefighting situations cabin crew members may assess and deem it necessary to slightly open baggage to allow entry of the extinguishing agent and non-flammable liquid. In order to avoid injury from a flash fire, cabin crew should use caution when opening the affected baggage when there is any indication of smoke or flames. This should only be done with extreme caution and only after donning appropriate protective equipment available on the aircraft.</p>
3.	<p>REMOVE POWER</p> <p>a) Disconnect the device from the power supply, if safe to do so. b) Turn off in-seat power, if applicable. c) Verify that power to the remaining electrical outlets remains off, if applicable.</p> <p style="text-align: center;"><u>The following is moved from the end of this step:</u></p> <p>Caution: <u>Do not attempt to remove the battery from the device.</u></p>

Amplified procedures for battery / portable electronic device (PED) fire / smoke	
<i>Step</i>	<i>Cabin crew action</i>
	<p>It is important to<u>that cabin crew</u> instruct the passenger to disconnect the device from the power supply, if it is deemed safe to do so. A battery has a higher likelihood of catching fire due to overheating during or immediately following a charging cycle, although the effects may be delayed for some period of time. By removing the external power supply from the device, it will be assured that additional energy is not being fed to the battery to promote a fire.</p> <p><u>Cabin crew should</u> Tturn off the in-seat power to the remaining electrical outlets until it can be assured that a malfunctioning aircraft system does not contribute to additional failures of the passengers' portable electronic devices.</p> <p><u>Cabin crew should</u> Vvisually check that power to the remaining electrical outlets remains off until the aircraft's system can be determined to be free of faults, if the device was previously plugged in.</p> <p>The removal of power may occur simultaneously to other cabin crew actions (e.g. obtaining water to deuse<u>pour on</u> the device). Depending on the aircraft type, in-seat power may have to be turned off by the flight crew members <u>may turn off in-seat power</u>.</p> <p>Caution: Do not attempt to remove the battery from the device.</p>

Amplified procedures for battery / portable electronic device (PED) fire / smoke	
<i>Step</i>	<i>Cabin crew action</i>
4.	<p><u>LEAVE THE DEVICE IN ITS PLACE AND DOUSE THE DEVICE WITH POUR WATER (OR OTHER NON-FLAMMABLE LIQUID) ON THE DEVICE</u></p> <p><u>Cabin crew need to use W</u>water (or other non-flammable liquid) must be used to cool a battery that has ignited to prevent the spread of heat to other cells in the battery. If water is not available, any non-flammable liquid may be used to cool the device. <u>Cabin crew should pour liquid onto the device until signs of steam and crackling have subsided completely.</u></p> <p><u>Note.</u>—Liquid may turn to steam when applied to the hot battery. <u>The action of pouring water or non-flammable liquid on the device cools the battery cells and prevents thermal runaway.</u></p> <hr style="width: 20%; margin: 10px auto;"/> <p style="text-align: center;">The following is moved from Step 5:</p> <p>A battery involved in a fire can reignite and emit flames multiple times as heat is transferred to other cells in the battery. Therefore, <u>cabin crew should monitor</u> the device must be monitored regularly to identify if there is any indication that a fire hazard may still exist. If there is any smoke or indication of fire, the device must be doused with <u>crew should pour</u> more water (or other non-flammable liquid) on the device.</p> <p>Caution:</p> <ol style="list-style-type: none"> a) Do not attempt to pick up or move the device; batteries may explode or burst into flames without warning. The device must <u>should</u> not be moved if displaying any of the following: flames/flaring, smoke, unusual sounds (such as crackling), debris, or shards of material separating from the device. b) Do not cover or enclose the device as it could cause it to overheat. c) Do not use ice or dry ice to cool the device. Ice or other materials insulate the device, increasing the likelihood that additional battery cells will reach thermal runaway.
5.	<p><u>LEAVE THE DEVICE IN ITS PLACE AND MONITOR FOR ANY INDICATION OF REIGNITION AND CONTINUE TO POUR WATER (OR OTHER NON-FLAMMABLE LIQUID) ON THE DEVICE</u></p> <p>A battery involved in a fire can reignite and emit flames multiple times as heat is transferred to other cells in the battery. Therefore, the device must be monitored regularly to identify if there is any indication that a fire hazard may still exist. If there is any smoke or indication of fire, the device must be doused with more water (or other non-flammable liquid).</p>

Amplified procedures for battery / portable electronic device (PED) fire / smoke	
<i>Step</i>	<i>Cabin crew action</i>
	<p>Caution:</p> <p>a) Do not attempt to pick up or move the device; batteries may explode or burst into flames without warning. The device must not be moved if displaying any of the following: flames/flaring, smoke, unusual sounds (such as crackling), debris, or shards of material separating from the device.</p> <p>b) Do not cover or enclose the device as it could cause it to overheat.</p> <p>c) Do not use ice or dry ice to cool the device. Ice or other materials insulate the device, increasing the likelihood that additional battery cells will reach thermal runaway.</p> <p>If smoke or flames reappear, cabin crew should repeat Steps 2 and 4.</p>
6.	<p><u>WHENWAIT UNTIL THE DEVICE HAS COOLED (e.g. APPROXIMATELY 10-15 MINUTES)</u></p> <p>TheCabin crew may move the device can be moved with caution following a certain period, once it has cooled down and if there is no evidence of smoke, heat, or if there is a reduction in the crackling or hissing sound usually associated with a lithium battery fire (e.g. after approximately 10-this may take approximately 15 minutes). The waiting period may vary based on the device and its size. The different circumstances (e.g. types of devices, phase of flight) should be addressed in the operator's training programme.</p>
7.	<p><u>OBTAIN A SUITABLE EMPTY CONTAINER</u></p> <p>A suitable empty container, such as may include a pot, jug, galley unit or toilet waste bin, must. <u>When selecting a suitable empty container, cabin crew should consider the size of the device to be submerged in it. Cabin crew should select a container which can be filled with enough water or non-flammable liquid to completely submerge the device.</u> It is important to wear available protective equipment (e.g. protective breathing equipment, fire gloves), when moving any device involved in a fire. Once the device is completely submerged, the container used must be stowed and, if possible, secured to prevent spillage.</p> <p><u>Note.— If the aircraft is equipped with a fire containment equipment and the device fits inside it, cabin crew should use the equipment following the manufacturer's instructions.</u></p>
8.	<p><u>FILL THE CONTAINER WITH ENOUGH WATER (OR OTHER NON-FLAMMABLE LIQUID) TO SUBMERGE THE DEVICE</u></p> <p><u>Cabin crew should fill the suitable empty container with enough water or non-flammable liquid to completely submerge the device.</u></p>

Amplified procedures for battery / portable electronic device (PED) fire / smoke	
<i>Step</i>	<i>Cabin crew action</i>
<u>9.</u>	<p><u>PLACE THE DEVICE IN THE CONTAINER AND COMPLETELY SUBMERGE IN WATER (OR OTHER NON-FLAMMABLE LIQUID), USING PROTECTIVE EQUIPMENT</u></p> <p><u>It is important that cabin crew wear protective equipment (e.g. protective breathing equipment, protective gloves), when moving any device involved in a fire.</u></p>
<u>10.</u>	<p><u>STOW AND SECURE (IF POSSIBLE) THE CONTAINER TO PREVENT SPILLAGE</u></p> <p><u>Once the device is completely submerged, cabin crew should stow the container and, if possible, secured to prevent spillage.</u></p>
<u>11.</u>	<p>MONITOR THE DEVICE AND THE SURROUNDING AREA FOR THE REMAINDER OF THE FLIGHT</p> <p><u>Monitor</u><u>Cabin crew should monitor</u> the device and the surrounding area for the remainder of the flight to verify that the device does not pose further hazard.</p>
<u>12.</u>	<p><u>APPLY POST-INCIDENT PROCEDURES AFTER LANDING AT THE NEXT DESTINATION</u></p> <p>Upon arrival, <u>cabin crew should</u> apply the operator's post-incident procedures. These may include identifying to ground personnel where the item is stowed and providing all information about the item.</p> <p><u>Complete</u><u>Crew should complete</u> the required documentation, as per operator procedures, so that the operator is notified of the event, proper maintenance action is undertaken and the emergency response kit or any aircraft equipment used is replenished or replaced, if applicable.</p>

3.4.2 Overhead bin battery / portable electronic device (PED) fire / smoke

Amplified procedures for overhead bin battery / portable electronic device (PED) fire / smoke	
<i>Step</i>	<i>Cabin crew action</i>
1.	<p>APPLY FIREFIGHTING PROCEDURE</p> <p><u>a) Apply communication procedures.</u> <u>b) Use appropriate firefighting equipment and protective equipment, as required.</u> <u>c) Fight fire.</u> <u>d) Manage passengers and cabin, as required.</u></p> <p><u>During Any occurrence concerning a fire in the cabin, the cabin crew should be notified immediately to notify the pilot-in-command who should be kept immediately and keep the flight crew informed of all actions taken and of the effect. It is essential that the cabin crew and the flight crew coordinate their actions and that each is kept fully informed of the other's actions and intentions.</u></p> <p style="text-align: center;"><u>The following is moved from the end of Step 1:</u></p> <p>Minimizing the spreading of smoke and fumes into the flight deck is critical for the continued safe operation of the aircraft, therefore it is essential to keep the flight deck door closed at all times. Crew communication and coordination are of utmost importance. The use of the interphone is the primary means of communication <u>between crew members,</u> unless the interphone system fails.</p> <p>Appropriate firefighting and emergency procedures must <u>should</u> be used to deal with <u>any overhead bin fire.</u> In a multi-cabin crew operation, the actions detailed in the firefighting procedure should be conducted simultaneously. On aircraft operated with only one cabin crew member, the aid of a passenger should be sought in dealing with the situation. <u>Cabin crew should use firefighting equipment to extinguish the fire and prevent its spread to additional flammable materials. It is important that cabin crew use protective equipment (e.g. protective breathing equipment, protective gloves) when fighting a fire. Due to the weight and size of some overhead bins, and their opening movement, the cabin crew member who is fighting the fire may require assistance in opening and controlling the overhead bin. When fighting an overhead bin fire, the cabin crew member should position themselves at the opposite end of the overhead bin, where the smoke / flames are visible. This action prevents further spreading embers due to the force of the extinguishing agent as it is discharged and comes into contact with the overhead bin.</u></p> <p>Halon, Halon replacement or water extinguisher should be used to extinguish the fire and prevent its spread to additional flammable materials. It is important to wear available protective equipment (e.g. protective breathing equipment, fire gloves) when fighting a fire.</p>

Amplified procedures for overhead bin battery / portable electronic device (PED) fire / smoke	
<i>Step</i>	<i>Cabin crew action</i>
	<p>If fire develops, cabin crew should take prompt action to move passengers away from the area involved and, if necessary, provide wet towels or cloths and give instructions for passengers to breathe through them.</p> <p><u>Note.— If the origin of the fire / smoke cannot be confirmed visually, cabin crew should use the back of the hand to search for hot overhead bin surfaces.</u></p> <p>Caution: <u>Do not use the palm of the hand but the back of the hand since it is more sensitive to temperature differences.</u></p> <p>Caution: <u>In certain firefighting situations, cabin crew may assess and deem it necessary to slightly open baggage to allow entry of the extinguishing agent and non-flammable liquid. In order to avoid injury from a flash fire, cabin crew should use caution when opening the affected baggage when there is any indication of smoke or flames. This should only be done after donning appropriate protective equipment.</u></p>
2.	<p>IDENTIFY THE ITEM</p> <p>It may not be possible to identify the item right away, especially if the fire has started in the overhead bin and the device is not readily accessible.</p> <p>If the device is visible and accessible, or, if the device is contained in baggage and flames are visible, <u>the firefighting procedures should be applied as a first step:</u></p> <p><u>a) Re-apply Step 1 to extinguish the flames, if applicable.</u> <u>b) Apply Steps 3 to 10.</u></p> <p>If smoke is coming from the overhead bin, but the device is not visible or accessible, or there is no indication of fire, the firefighting procedures should be applied as a first step. Afterwards, all baggage should be removed from the overhead bin with caution until the item can be identified. Once the item is identified, apply:</p> <p><u>a) Remove other baggage from the overhead bin to access the affected baggage/item.</u> <u>b) Identify the item.</u> <u>c) Apply Steps 3 to 10.</u></p> <p><u>It may not be possible for cabin crew to identify the item (source of fire or smoke) right away, especially if the fire has started in an overhead bin or the device is not readily accessible.</u></p> <p><u>If the device is visible and accessible or if the device is contained in baggage and flames are visible, cabin crew should apply firefighting procedures, as a first step.</u></p>

Amplified procedures for overhead bin battery / portable electronic device (PED) fire / smoke	
<i>Step</i>	<i>Cabin crew action</i>
	<p><u>If smoke is coming from the overhead bin, but the device is not visible or accessible, or there is no indication of fire, cabin crew should apply firefighting procedures, as a first step. Afterwards, cabin crew should remove all baggage from the overhead bin with caution until the item can be identified. Once the item is identified, apply Steps 3 to 10.</u></p> <p>Caution: In order to avoid injury from a flash fire, it is not recommended to open the affected baggage when there is any indication of smoke or flames. However, in certain situations cabin crew members may assess and deem it necessary to slightly open baggage to allow entry of the extinguishing agent and non-flammable liquid. This should be done with extreme caution and only after donning appropriate protective equipment available on the aircraft.</p>
3.	<p><u>DOUSE LEAVE THE DEVICE (BAGGAGE) WITH IN ITS PLACE AND POUR WATER (OR OTHER NON-FLAMMABLE LIQUID) ON THE DEVICE (BAGGAGE)</u></p> <p>Water (or other non-flammable liquid) must be used to cool a battery that has ignited to prevent the spread of heat to other cells in the battery. If water is not available, any non-flammable liquid may be used to cool the device. Cabin crew need to use water (or other non-flammable liquid) to cool a battery that has ignited to prevent the spread of heat to other cells in the battery. Cabin crew should pour liquid onto the device until signs of steam and crackling have subsided completely.</p> <p><u>Note.— Liquid may turn to steam when applied to the hot battery. The action of pouring water or non-flammable liquid on the device cools the battery cells and prevents thermal runaway.</u></p> <p><u>A battery involved in a fire can reignite and emit flames multiple times as heat is transferred to other cells in the battery. Therefore, cabin crew should monitor the device regularly to identify if there is any indication that a fire hazard may still exist. If there is any smoke or indication of fire, crew should pour more water (or other non-flammable liquid) on the device.</u></p> <p>Caution:</p> <ol style="list-style-type: none"> a) <u>Do not attempt to pick up or move the device; batteries may explode or burst into flames without warning. The device should not be moved if displaying any of the following: flames/flaring, smoke, unusual sounds (such as crackling), debris, or shards of material separating from the device.</u> b) <u>Do not cover or enclose the device as it could cause it to overheat.</u> c) <u>Do not use ice or dry ice to cool the device. Ice or other materials insulate the device, increasing the likelihood that additional battery cells will reach thermal runaway.</u>

Amplified procedures for overhead bin battery / portable electronic device (PED) fire / smoke	
<i>Step</i>	<i>Cabin crew action</i>
4	<p><u>MONITOR FOR ANY INDICATION OF REIGNITION AND CONTINUE TO POUR WATER (OR OTHER NON-FLAMMABLE LIQUID) ON THE DEVICE</u></p> <p><u>If smoke or flames reappear, cabin crew should repeat Steps 1 and 3.</u></p>
4.5.	<p><u>WHEN WAIT UNTIL THE DEVICE HAS COOLED</u></p> <p>The device should be moved from the overhead bin to prevent a hidden fire from potentially developing. The device can be moved <u>Cabin crew may move the device</u> with caution following a certain period, once it has cooled down and if there is no evidence of smoke, heat, or if there is a reduction in the crackling or hissing sound usually associated with a lithium battery fire <u>(this may take approximately 15 minutes)</u>. The waiting period may vary based on the device and its size. The different circumstances (e.g. types of devices, phase of flight) should be addressed in the operator's training programme.</p>
6.	<p><u>OBTAIN A SUITABLE EMPTY CONTAINER</u></p> <p>A suitable empty container, such as <u>may include</u> a pot, jug, galley unit or toilet waste bin, must. <u>When selecting a suitable empty container, cabin crew should consider the size of the device to be submerged in it. Cabin crew should select a container which can be filled with enough water or non-flammable liquid to completely submerge the device. It is important to wear available protective equipment (e.g. protective breathing equipment, fire gloves), when moving any device involved in a fire. Once the device is completely submerged, the container used must be stowed and, if possible, secured to prevent spillage.</u></p> <p><u>Note.— If the aircraft is equipped with a fire containment equipment and the device fits inside it, cabin crew should use the equipment following the manufacturer's instructions.</u></p>
7.	<p><u>FILL THE CONTAINER WITH ENOUGH WATER (OR OTHER NON-FLAMMABLE LIQUID) TO SUBMERGE THE DEVICE</u></p> <p><u>Cabin crew should fill the suitable empty container with enough water or non-flammable liquid to completely submerge the device.</u></p>
8.	<p><u>PLACE THE DEVICE IN THE CONTAINER AND COMPLETELY SUBMERGE IN WATER (OR OTHER NON-FLAMMABLE LIQUID), USING PROTECTIVE EQUIPMENT</u></p> <p><u>It is important that cabin crew wear protective equipment (e.g. protective breathing equipment, protective gloves), when moving any device involved in a fire.</u></p>

Amplified procedures for overhead bin battery / portable electronic device (PED) fire / smoke	
<i>Step</i>	<i>Cabin crew action</i>
<u>9.</u>	<p><u>STOW AND SECURE (IF POSSIBLE) THE CONTAINER TO PREVENT SPILLAGE</u></p> <p><u>Once the device is completely submerged, cabin crew should stow the container and, if possible, secured to prevent spillage.</u></p>
<u>510.</u>	<p>MONITOR THE DEVICE AND THE SURROUNDING AREA FOR THE REMAINDER OF THE FLIGHT</p> <p><u>Monitor</u>Cabin crew should monitor the device and the surrounding area for the remainder of the flight to verify that the device does not pose further hazard.</p>
<u>611.</u>	<p><u>APPLY POST-INCIDENT PROCEDURES AFTER LANDING AT THE NEXT DESTINATION</u></p> <p>Upon arrival, <u>cabin crew should</u> apply the operator's post-incident procedures. These may include identifying to ground personnel where the item is stowed and providing all information about the item.</p> <p><u>Complete</u>Crew should complete the required documentation, as per operator procedures, so that the operator is notified of the event, proper maintenance action is undertaken and the emergency response kit or any aircraft equipment used is replenished or replaced, if applicable.</p>

3.4.3 Overheated battery / electrical smell involving a portable electronic device (PED) — no visible fire or smoke

Amplified procedures for overheated battery / electrical smell involving a portable electronic device (PED) — no visible fire or smoke	
Step	Cabin crew action
1.	<p>IDENTIFY THE ITEM</p> <p><u>Cabin crew should identify the source of overheat or electrical smell, or Ask the passenger concerned to identify the item.</u></p>
2.	<p>INSTRUCT THE PASSENGER TO TURN OFF THE DEVICE IMMEDIATELY</p> <p>It is important to<u>that cabin crew</u> instruct the passenger to turn off the device immediately, <u>if possible and safe to do so, to remove the power supply and prevent further overheating or a fire.</u></p>
3.	<p>REMOVE POWER</p> <p><u>a) Disconnect the device from the power supply, if safe to do so.</u> <u>b) Turn off in-seat power, if applicable.</u> <u>c) Verify that power to the remaining electrical outlets remains off, if applicable.</u> <u>d) Verify that the device remains off for the remainder of the flight.</u></p> <p style="text-align: center;"><u>The following is moved from the end of Step 3:</u></p> <p>Caution: <u>Do not attempt to remove the battery from the device.</u></p> <p>It is important to<u>that cabin crew</u> instruct the passenger or crew member to disconnect the device from the power supply, if it is deemed safe to do so. A battery has a higher likelihood of catching fire due to overheating during or immediately following a charging cycle, although the effects may be delayed for some period of time. By removing the external power supply from the device, it will be assured that additional energy is not being fed to the battery to promote a fire.</p> <p><u>Cabin crew should Turn off the in-seat power to the remaining electrical outlets until it can be assured that a malfunctioning aircraft system does not contribute to additional failures of the passengers' portable electronic devices.</u></p> <p><u>Cabin crew should Visually check that power to the remaining electrical outlets remains off until the aircraft's system can be determined to be free of faults, if the device was previously plugged in. Depending on the aircraft type, in-seat power may have to be turned off by the flight crew.</u></p>

Amplified procedures for overheated battery / electrical smell involving a portable electronic device (PED) — no visible fire or smoke	
<i>Step</i>	<i>Cabin crew action</i>
	<p>The removal of power may occur simultaneously to other cabin crew actions (e.g. obtaining water to douse the device). Depending on the aircraft type, in-seat power may have to be turned off by the flight crew members.</p> <p>It is important to <u>that cabin crew</u> verify that the device remains turned off for the duration of the flight.</p> <p>Caution: Do not attempt to remove the battery from the device.</p>
4.	<p>INSTRUCT THE PASSENGER TO KEEP THE DEVICE VISIBLE AND MONITOR CLOSELY</p> <p>The device must<u>should</u> remain visible (not stowed such as in baggage or seat pocket or on a person (pocket)) and should be monitored closely. Unstable batteries may ignite even after the device is turned off. Verify<u>Cabin crew should verify</u> that the device is stowed <u>only</u> for landing.</p>
5.	<p><u>APPLY PROCEDURES FOR BATTERY / PED FIRE / SMOKE IF SMOKE OR FLAMES APPEAR</u></p> <p>If smoke or flames appear, apply the BATTERY / PORTABLE ELECTRONIC DEVICE (PED) FIRE / SMOKE procedures (see 3.4.1).</p>
6.	<p><u>APPLY POST-INCIDENT PROCEDURES AFTER LANDING AT THE NEXT DESTINATION</u></p> <p>Upon arrival, <u>cabin crew should</u> apply the operator's post-incident procedures. These may include identifying to ground personnel where the item is stowed and providing all information about the item.</p> <p><u>Crew should</u> Ccomplete the required documentation, as per operator procedures, so that the operator is notified of the event, proper maintenance action is undertaken and the emergency response kit or any aircraft equipment used is replenished or replaced, if applicable.</p>

3.4.4 PED ~~inadvertently crushed or damaged in electrically adjustable~~ **fallen into / trapped in a passenger seat**

The following paragraph is moved to Step 3:

~~Due to the design of some electrically adjustable passenger seats, a PED can slip under a seat covering and/or cushion, behind an armrest or down the side of a seat. Inadvertent crushing of the device poses a fire hazard.~~

Amplified procedures for PED inadvertently crushed or damaged in electrically adjustable fallen into / trapped in a passenger seat	
Step	Cabin crew action
4.	<p>Moved to Step 3:</p> <p>NOTIFY THE PILOT-IN-COMMAND / OTHER CABIN CREW MEMBERS</p> <p>Any occurrence concerning a fire hazard in the cabin should be notified immediately to the pilot-in-command who should be kept informed of all actions taken and of the effect. It is essential that the cabin crew and the flight crew coordinate their actions and that each is kept fully informed of the other's actions and intentions.</p>
21.	<p>OBTAIN INFORMATION FROM <u>THE PASSENGER</u> <u>BY ASKING THE PASSENGER</u></p> <p>a) Ask the passenger to identify the item. b) Ask where the passenger suspects that the item may have dropped or slipped into. c) Ask if the seat was moved since misplacing the item.</p> <p>Cabin crew should Ask the passenger concerned to identify the item, and where the passenger suspects it may have dropped or slipped into, and if the passenger has moved the seat since misplacing the item.</p>
32.	<p>RETRIEVE AND USE PROTECTIVE EQUIPMENT, <u>IF AVAILABLE</u></p> <p>If available, Cabin crew members should don fire protective gloves before trying to retrieve the item.</p>
3.	<p>Moved from Step 1:</p> <p>NOTIFY THE PILOT-IN-COMMAND / OTHER CABIN CREW MEMBERS</p> <p>The following is moved from before this table:</p> <p>Due to the design of some electrically adjustable passenger seats, a PED can slip under a seat covering and/or cushion, behind an armrest or down the side of a seat. Inadvertent crushing of the device poses a fire hazard.</p>

Amplified procedures for PED inadvertently crushed or damaged in electrically adjustable <u>fallen into / trapped in a passenger seat</u>	
Step	Cabin crew action
	<p><u>Moved from Step 1:</u></p> <p>Any occurrence concerning a fire hazard in the cabin should be notified immediately to the pilot-in-command who should be kept informed of all actions taken and of the effect. It is essential that the cabin crew and the flight crew coordinate their actions and that each is kept fully informed of the other's actions and intentions.</p>
4.	<p><u>RETRIEVE THE ITEM IF SAFE TO DO SO</u></p> <p><u>Caution:</u> <u>Do not move the seat electrically or mechanically when attempting to retrieve the item.</u></p> <p>To prevent crushing of the PED and reduce the potential fire hazard to the device and the surrounding area, cabin crew members and/or the passengers must <u>should</u> not use the electrical or mechanical seat functions in an attempt to retrieve the item. <u>Cabin crew should</u> Mmove the passenger and, if applicable, the passenger(s) seated next to the affected seat from the area, to facilitate the search. Do <u>Cabin crew should</u> not move the seat. <u>If the cabin crew is unable to retrieve the item without moving the seat, it may need to be retrieved by personnel on the ground, after landing at the next destination. If the item cannot be retrieved, the cabin crew member is unable to retrieve the item, it may be necessary to</u> <u>should</u> move the passenger to another seat, if available.</p> <p><u>Cabin crew should turn off the individual in-seat power, if possible, to do so. Depending on the aircraft type, in-seat power may have to be turned off by the flight crew.</u></p>
5.	<p><u>APPLY PROCEDURES FOR BATTERY / PED FIRE / SMOKE IF SMOKE OR FLAMES APPEAR</u></p> <p>If smoke or flames appear, apply the BATTERY / PORTABLE ELECTRONIC DEVICE (PED) FIRE / SMOKE procedures (see 3.4.1).</p>
6.	<p><u>MONITOR THE SEAT AND THE SURROUNDING AREA FOR THE REMAINDER OF THE FLIGHT</u></p> <p><u>Cabin crew should monitor the seat and the surrounding area for the remainder of the flight to verify that the device does not pose further hazard.</u></p>

Amplified procedures for PED inadvertently crushed or damaged in electrically adjustable <u>fallen into / trapped in a passenger seat</u>	
<i>Step</i>	<i>Cabin crew action</i>
<u>6-7.</u>	<p><u>APPLY POST-INCIDENT PROCEDURES</u> AFTER LANDING AT THE NEXT DESTINATION</p> <p>Upon arrival, <u>cabin crew should</u> apply the operator's post-incident procedures. These may include identifying to ground personnel where the item is located and providing all information about the item.</p> <p><u>Crew should</u> <u>complete</u> the required documentation, as per operator procedures, so that the operator is notified of the event, proper maintenance action is undertaken and <u>the emergency response kit or</u> any aircraft equipment used is replenished or replaced, if applicable.</p>

3.4.5 Battery / portable electronic device (PED) fire / smoke on the flight deck

<u>Amplified procedures for battery / portable electronic device (PED) fire / smoke on the flight deck</u>	
<u>Step</u>	<u>Cabin crew action</u>
1.	<p><u>RECOGNIZE SIGNAL FOR FIRE / SMOKE ON THE FLIGHT DECK</u></p> <p>a) <u>Receive call out from the flight deck (e.g. “back up assistance P-E-D!”).</u> b) <u>Retrieve and use protective equipment, as applicable to the situation.</u> c) <u>Obtain the appropriate fire extinguisher.</u> d) <u>Enter the flight deck.</u></p> <p><u><i>Note.— The first cabin crew member ready to act should enter the flight deck.</i></u></p> <p><u>The flight crew’s main responsibility during any occurrence is to maintain control of the aircraft. Therefore, they may call upon the cabin crew to assist in the event of fire / smoke on the flight deck. As notifying the cabin crew of the fire / smoke occurrence on the flight deck by interphone may delay the response, the use of the public address (PA) system is considered the preferred method of notification. The flight crew should use phraseology that clearly explains the type of emergency situation to the cabin crew without creating panic amongst the passengers. The flight crew should use specific sentence, such as “back up assistance P-E-D!”, over the PA system to alert the cabin crew. The first cabin crew member who is ready to act should enter the flight deck.</u></p> <p><u>It is important that cabin crew use protective equipment (e.g. protective breathing equipment, protective gloves) when fighting a fire. Cabin crew should use firefighting equipment to extinguish the fire and prevent its spread to additional flammable materials.</u></p>

<u>Amplified procedures for battery / portable electronic device (PED) fire / smoke on the flight deck</u>	
<u>Step</u>	<u>Cabin crew action</u>
<u>2.</u>	<p><u>APPLY FIREFIGHTING PROCEDURE</u></p> <p>a) <u>If the item is on fire, in coordination with the flight crew, extinguish the fire.</u> b) <u>Once the fire has been extinguished or the device is not on fire (it may emit visible smoke or be overheated), remove it from the flight deck, if possible.</u> c) <u>If the device cannot be moved, pour water (or other non-flammable liquid) on it.</u></p> <p><u>The joint action between the flight crew and the cabin crew depends on the location and type of the affected device. The flight crew would normally have started the appropriate emergency procedures to deal with the fire before the arrival of the cabin crew, including removing the device from any power source. In that case, cabin crew should join the firefighting actions according to the situation. When the decision is taken to fight the fire on the flight deck, in coordination with the flight crew, the cabin crew should use firefighting equipment to extinguish the fire and prevent its spread to additional flammable materials. It is important that cabin crew wear protective equipment (e.g. protective breathing equipment, protective gloves) when fighting a fire in a confined space, such as the flight deck.</u></p> <p><u>Caution:</u> <u>In certain firefighting situations (e.g. to prevent flight crew incapacitation or a loss of control in-flight), crew may assess and deem it necessary to remove the device immediately from the flight deck even if it is still emitting smoke or flames are present. In order to avoid injury, cabin crew should use caution and only attempt this action after donning protective equipment. In such case, cabin crew should apply the firefighting procedure in 3.4.1, after the device is removed from the flight deck.</u></p>
<u>3</u>	<p><u>REMOVE THE DEVICE FROM THE FLIGHT DECK</u></p> <p><u>Once the fire has been extinguished or the device is no longer on fire (even if it is still emitting visible smoke or feels overheated), cabin crew should remove it from the flight deck, if possible. Minimizing the spreading of smoke and fumes in the flight deck is critical for the continued safe operation of the aircraft. If it cannot be moved, cabin crew should use water (or other non-flammable liquid) to cool a battery that has ignited to prevent the spread of heat to other cells in the battery.</u></p> <p><u>After the device is removed from the flight deck, the cabin crew should apply the firefighting procedure, as described in 3.4.1, if it is still on fire. Water (or other non-flammable liquid) should be used to cool a battery that has ignited to prevent the spread of heat to other cells in the battery.</u></p>
<u>4</u>	<p><u>CLOSE THE FLIGHT DECK DOOR</u></p> <p><u>The flight deck door should be maintained closed once the device is removed from the flight deck. Crew communication and coordination are of utmost importance. The use of the interphone is the primary means of communication unless that system fails.</u></p>

<u>Amplified procedures for battery / portable electronic device (PED) fire / smoke on the flight deck</u>	
<u>Step</u>	<u>Cabin crew action</u>
<u>5</u>	<p><u>APPLY PROCEDURES FOR BATTERY / PED FIRE / SMOKE IF SMOKE OR FLAMES APPEAR</u></p> <p><u>After the device is removed from the flight deck, apply the BATTERY / PORTABLE ELECTRONIC DEVICE (PED) FIRE / SMOKE procedures (see 3.4.1).</u></p>
<u>6.</u>	<p><u>APPLY POST-INCIDENT PROCEDURES AFTER LANDING AT THE NEXT DESTINATION</u></p> <p><u>Upon arrival, cabin crew should apply the operator's post-incident procedures. These may include identifying to ground personnel where the item is stowed and providing all information about the item. Crew should complete the required documentation, as per operator procedures, so that the operator is notified of the event, proper maintenance action is undertaken and the emergency response kit or any aircraft equipment used is replenished or replaced, if applicable.</u></p>

3.4.56 Fire involving dangerous goods

Amplified procedures for fire involving dangerous goods	
<i>Step</i>	<i>Cabin crew action</i>
1.	<p>IDENTIFY THE ITEM</p> <p><u>Cabin crew should</u> <u>ask</u> the passenger concerned to identify the item. The passenger may be able to give some guidance on the hazard(s) involved and how these could be dealt with. If the passenger can identify the item, refer to Section 4 of this document for the appropriate emergency response drill.</p> <p>It may not be possible <u>for cabin crew</u> to identify the item right away, especially if the source of the fire is unknown or the item is not readily accessible. In this case, <u>cabin crew should apply</u> firefighting procedures should be applied as a first step <u>(Step 2)</u>. Once it is possible to do so, and then attempt to identify the item after the fire is under control <u>(Step 1)</u>. If the item is contained in baggage, the crew's actions would be similar to the actions for an item that is visible or readily accessible.</p> <p>Caution: In order to avoid injury from a flash fire, it is not recommended to open the affected baggage when there is any indication of smoke or flames. However, in certain situations cabin crew members may assess and deem it necessary to slightly open baggage to allow entry of the extinguishing agent and non-flammable liquid. This should be done with extreme caution and only after donning appropriate protective equipment available on the aircraft.</p>
2.	<p>APPLY THE FIREFIGHTING PROCEDURE</p> <p><u>a) Apply communication procedures.</u> <u>b) Use appropriate firefighting equipment and protective equipment, as required.</u> <u>c) Fight fire.</u> <u>d) Manage passengers and cabin, as required.</u></p> <p><u>During</u> <u>any</u> occurrence concerning a fire in the cabin, <u>the cabin crew</u> should be notified immediately to <u>notify</u> the pilot-in-command immediately who should be kept and keep the flight crew informed of all actions taken and of the effect. It is essential that the cabin crew and the flight crew coordinate their actions and that each is kept fully informed of the other's actions and intentions.</p> <p style="text-align: center;"> <hr/> The following is moved from the last paragraph of this step <hr/> </p> <p>Minimizing the spreading of smoke and fumes into the flight deck is critical for the continued safe operation of the aircraft, therefore it is essential to keep the flight deck door closed at all times. Crew communication and coordination are of utmost importance. The use of the interphone is the primary means of communication <u>between crew members</u>, unless the interphone system fails.</p>

Amplified procedures for fire involving dangerous goods	
Step	<i>Cabin crew action</i>
	<p>Appropriate firefighting and emergency procedures must <u>should</u> be used to deal with any fire. In a multi-cabin crew operation, the actions detailed in the firefighting procedure should be conducted simultaneously. On aircraft operated with only one cabin crew member, the aid of a passenger should be sought in dealing with the situation. <u>Cabin crew should use firefighting equipment to extinguish the fire and prevent its spread to additional flammable materials.</u></p> <p>In general, <u>cabin crew should not use</u> water should not be used on a spillage or when fumes are present since it may spread the spillage or increase the rate of fuming. Consideration should also be given to the possible presence of electrical components when using water extinguishers. <u>It is important that cabin crew use protective equipment (e.g. protective breathing equipment, protective gloves) when fighting a fire.</u></p> <p>If fire develops, cabin crew should take prompt action to move passengers away from the area involved and, if necessary, provide wet towels or cloths and give instructions for passengers to breathe through them.</p> <p style="text-align: center;">_____</p> <p style="text-align: center;">The following is moved to the end of the first paragraph after the letter list of this step.</p> <p style="text-align: center;">_____</p> <p>Minimizing the spreading of smoke and fumes into the flight deck is critical for the continued safe operation of the aircraft, therefore it is essential to keep the flight deck door closed at all times. Crew communication and coordination are of utmost importance. The use of the interphone is the primary means of communication unless the interphone system fails.</p> <p>Caution: <u>In certain firefighting situations, cabin crew may assess and deem it necessary to slightly open baggage to allow entry of the extinguishing agent and non-flammable liquid. In order to avoid injury from a flash fire, cabin crew should use caution when opening the affected baggage when there is any indication of smoke or flames. This should only be done after donning appropriate protective equipment.</u></p>
3.	<p>MONITOR FOR ANY <u>INDICATION OF</u> REIGNITION</p> <p>Monitor the area regularly to identify if there is any indication that a fire hazard may still exist. If there is any smoke or indication of fire, continue to apply the firefighting procedure. If smoke or flames reappear, cabin crew should repeat Step 2.</p>
4.	<p><u>APPLY PROCEDURES FOR SPILLAGE OR LEAKAGE OF DANGEROUS GOODS, IF REQUIRED, ONCE THE FIRE HAS BEEN EXTINGUISHED</u></p> <p>In the event of a fire involving dangerous goods, <u>cabin crew may need to apply</u> the SPILLAGE OR LEAKAGE INVOLVING DANGEROUS GOODS procedures (see 3.4.67) may need to be applied once the fire has been extinguished.</p>

Amplified procedures for fire involving dangerous goods	
<i>Step</i>	<i>Cabin crew action</i>
5.	<p><u>APPLY POST-INCIDENT PROCEDURES</u> AFTER LANDING AT THE NEXT DESTINATION</p> <p>Upon arrival, <u>cabin crew should</u> apply the operator's post-incident procedures. These may include identifying to ground personnel where the item is stowed and providing all information about the item.</p> <p><u>Crew should</u> complete the required documentation, as per operator procedures, so that the operator is notified of the event, proper maintenance action is undertaken and the emergency response kit or any aircraft equipment used is replenished or replaced, if applicable.</p>

3.4.67 Spillage or leakage of dangerous goods

Amplified procedures for spillage or leakage of dangerous goods	
Step	Cabin crew action
1.	<p>NOTIFY THE PILOT-IN-COMMAND / OTHER CABIN CREW MEMBERS</p> <p>During Aany incident occurrence concerning dangerous goods, the cabin crew should be notified immediately to notify the pilot-in-command immediately who should be kept and keep the flight crew informed of all actions taken and of their the effect. It is essential that the cabin crew and the flight crew coordinate their actions and that each is kept fully informed of the other's actions and intentions.</p> <p>Minimizing the spreading of smoke and fumes into the flight deck is critical for the continued safe operation of the aircraft, therefore it is essential to keep the flight deck door closed at all times. Crew communication and coordination are of utmost importance. The use of the interphone is the primary means of communication between crew members, unless the interphone system fails.</p>
2.	<p>IDENTIFY THE ITEM</p> <p>Cabin crew should Aask the passenger concerned to identify the item and indicate its potential hazards. The passenger may be able to give some guidance on the hazard(s) involved and how these could be dealt with. If the passenger can identify the item, refer to Section 4 of this document for the appropriate emergency response drill.</p> <p>On aircraft with only one cabin crew member, consult with the pilot-in-command as to whether the aid of a passenger should be sought in dealing with the incident.</p>
3.	<p>COLLECT EMERGENCY RESPONSE KIT OR OTHER USEFUL ITEMS</p> <p>Cabin crew should Ccollect emergency response kit, if provided, or collect for use in dealing with the spillage or leakage:</p> <ul style="list-style-type: none"> a) aA supply of paper towels or newspapers or other absorbent paper or absorbent fabric (e.g. seat cushion covers, head rest protectors); b) even Protective gloves or fire-resistant gloves, if available; c) aAt least two large polyethylene waste bin bags; and d) aAt least three smaller polyethylene bags, such as those used for duty-free or bar sales or, if none available, airsickness bags.

Amplified procedures for spillage or leakage of dangerous goods	
<i>Step</i>	<i>Cabin crew action</i>
4.	<p>DON RUBBER GLOVES AND SMOKE HOOD RETRIEVE AND USE PROTECTIVE EQUIPMENT</p> <p><u>It is important that cabin crew use protective equipment (e.g. protective breathing equipment, protective gloves) when handling a spillage or leakage of dangerous goods.</u></p> <p><u>The Cabin crew should always protect their hands</u> should always be protected before touching suspicious packages or items. Fire-resistant gloves or oven gloves covered by polyethylene bags are likely to give suitable protection.</p> <p>Gas-tight breathing equipment should always be worn when attending to an incident involving smoke, fumes or fire.</p>
5.	<p>MOVE PASSENGERS AWAY FROM AREA AND DISTRIBUTE WET TOWELS OR CLOTHS</p> <p>The use of therapeutic oxygen bottles or the passenger drop-out oxygen system to assist passengers in a smoke- or fume-filled passenger cabin should not be considered since considerable quantities of fumes or smoke would be inhaled through the valves or holes in the masks. A more effective aid to passengers in a smoke- or fume-filled environment would be the use of a wet towel or cloth held over the mouth and nose. A wet towel or cloth aids in filtering and is more effective at doing this than a dry towel or cloth. Cabin crew should take prompt action if smoke or fumes develop and move passengers away from the area involved and, if possible, provide wet towels or cloths and give instructions to breathe through them.</p>
6.	<p>PLACE DANGEROUS GOODS ITEM IN POLYETHYLENE BAGS</p> <p><u>Note.</u>—In the case of a spill of known or suspected dangerous goods in powder form, <u>cabin crew should:</u></p> <ul style="list-style-type: none"> —a) <u>L</u>leave everything undisturbed.; —b) do not <u>N</u>ot use fire agent or water.; —c) <u>C</u>over area with polyethylene or other plastic bags and blankets.; —d) <u>K</u>keep area isolated until after landing.

Amplified procedures for spillage or leakage of dangerous goods	
<i>Step</i>	<i>Cabin crew action</i>
	<p>With emergency response kit</p> <p>If it is <u>absolutely</u> certain that the item will not create a problem, the decision may be made not to move it. In most circumstances, however, it will be better to move the item, and this should be done as suggested below. <u>Cabin crew should</u> <u>P</u>lace the item in a polyethylene bag as follows:</p> <ul style="list-style-type: none"> <u>a)</u> <u>P</u>repare two bags by rolling up the sides and placing them on the floor. <u>b)</u> <u>P</u>lace the item inside the first bag with the closure of the item, or the point from which it is leaking from its container, at the top. <u>c)</u> <u>T</u>ake off the rubber gloves while avoiding skin contact with any contamination on them. <u>d)</u> <u>P</u>lace the rubber gloves in the second bag. <u>e)</u> <u>C</u>lose the first bag while squeezing out the excess air. <u>f)</u> <u>T</u>wist the open end of the first bag and use a bag tie to tie it sufficiently tight to be secure but not so tight that pressure equalization cannot take place. <u>g)</u> <u>P</u>lace the first bag (containing the item) in the second bag, which already contains the rubber gloves and secure the open end in the same manner as that used for the first bag. <p>With no emergency response kit</p> <p><u>Cabin crew should</u> <u>P</u>ick up the item and place it in a polyethylene bag. <u>They should</u> <u>E</u>nsure the receptacle containing the dangerous goods is kept upright or the area of leakage is at the top. Using paper towels, newspaper, etc., <u>cabin crew should</u> mop up the spillage, after having ascertained there will be no reaction between what is to be used to mop up and the dangerous goods. <u>They should</u> <u>P</u>lace the soiled towels, etc., in another polyethylene bag. <u>Cabin crew should</u> <u>P</u>lace the gloves and bags used to protect the hands either in a separate small polyethylene bag or with the soiled towels. If extra bags are not available, <u>cabin crew should</u> place the towels, gloves, etc., in the same bag as the item. <u>They should</u> <u>E</u>xpel excess air from the bags and close tightly so as to be secure but not so tight that pressure equalization cannot take place.</p>

Amplified procedures for spillage or leakage of dangerous goods	
<i>Step</i>	<i>Cabin crew action</i>
7.	<p>STOW POLYETHYLENE BAGS</p> <p>If there is a catering or bar box on board, <u>cabin crew should</u> empty any contents and place the box on the floor, with the door upward. <u>They should</u> Pplace the bag(s) containing the item and any soiled towels, etc., in the box and close the door. <u>Cabin crew should</u> Ttake the box or, if there is no box, the bag(s) to a position as far away as possible from the flight deck and passengers. If a galley or toilet is fitted, <u>cabin crew should</u> consider taking the box or bag(s) there, unless it is close to the flight deck. <u>Cabin crew should</u> Uuse a rear galley or toilet wherever possible, but do <u>should</u> not place the box or bag(s) against the pressure bulkhead or fuselage wall. If a galley is used, the box or bag(s) can be stowed in an empty waste bin container. If a toilet is used, the box can be placed on the floor or the bag(s) stowed in an empty waste container. The toilet door should be locked from the outside. In a pressurized aircraft, if a toilet is used, any fumes will be vented away from passengers. However, if the aircraft is unpressurized there may not be positive pressure in a toilet to prevent fumes from entering the passenger cabin.</p> <p><u>Cabin crew should</u> Eensure when moving a box that the opening is kept upward or when moving a bag that either the receptacle containing the dangerous goods is kept upright or the area of leakage is kept at the top.</p> <p>Wherever the box or bag(s) have been located, <u>cabin crew should</u> wedge them firmly in place to prevent them from moving and to keep the item upright. <u>They should</u> Eensure that the position of the box or bags will not impede disembarkation from the aircraft.</p>
8.	<p>TREAT AFFECTED SEAT CUSHIONS / COVERS IN THE SAME MANNER AS DANGEROUS GOODS ITEM</p> <p><u>Cabin crew should remove</u> Sseat cushions, seat backs or other furnishings which have been contaminated by a spillage should be removed from their fixtures and placed <u>them</u> in a large bin bag or other polyethylene bag, together with any bags used initially to cover them. They <u>Cabin crew</u> should be stowed <u>them</u> away in the same manner as the dangerous goods item causing the incident.</p>

Amplified procedures for spillage or leakage of dangerous goods	
<i>Step</i>	<i>Cabin crew action</i>
9.	<p>COVER SPILLAGE ON CARPET / FLOOR</p> <p><u>Cabin crew should</u> Ccover any spillage on the carpet or furnishings with a waste bag or other polyethylene bags, if available. If not, <u>cabin crew should</u> use airsickness bags opened out so that the plastic side covers the spillage or use the plastic covered emergency information cards.</p> <p><u>If possible, cabin crew should roll up</u> Ccarpet which has been contaminated by a spillage and which is still causing fumes despite being covered, should be rolled up, if possible, and placed <u>it</u> in a large bin bag or other polyethylene bag. It <u>Cabin crew</u> should be placed <u>it</u> in a waste bin and stowed <u>it</u>, when possible, either in the rear toilet or rear galley. If the carpet cannot be removed it should remain covered by a large bin bag or polyethylene bags, etc., and additional bags should be used to reduce the fumes.</p>
10.	<p>REGULARLY INSPECT <u>MONITOR</u> ITEMS STOWED AWAY / CONTAMINATED FURNISHINGS</p> <p><u>Cabin crew should monitor</u> Aany dangerous goods, contaminated furnishings or equipment which have been removed and stowed away or covered for safety should be subject to regular inspection.</p>
11.	<p><u>APPLY POST-INCIDENT PROCEDURES</u> AFTER LANDING AT THE NEXT DESTINATION</p> <p>Upon arrival, <u>cabin crew should</u> apply the operator's post-incident procedures. These may include identifying to ground personnel where the item is stowed and providing all information about the item.</p> <p><u>Crew should</u> Ccomplete the required documentation, as per operator procedures, so that the operator is notified of the event, proper maintenance action is undertaken and the emergency response kit or any aircraft equipment used is replenished or replaced, if applicable.</p>

Section 4

CHART OF DRILLS AND LIST OF DANGEROUS GOODS WITH DRILL REFERENCE NUMBERS

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Amendment to drill codes to reflect amendments to dangerous goods list in the UN Model Regulations, Chapter 3.2, dangerous goods list (see ST/SG/AC.10/50/Add.1):

Amendments to manage aviation specific risks

Paragraph 4.2.4.1 of DGP/29-WP/3 and 2.4.1 of this report:

Amend Tables 4-2 and 4-3 as indicated:

Note.— Revisions to the proper shipping name in Table 3-1 of the Technical Instructions will automatically be reflected in the associated records included in Tables 4-2 and 4-3 of Doc 9481 through the publishing process. The entries shown here are those for which an amendment to the drill code is necessary.

<i>UN No.</i>	<i>Drill Code</i>	<i>Proper shipping name</i>
<u>0514</u>	<u>3L</u>	<u>Fire suppressant dispersing devices</u>
1835		<u>Tetramethylammonium hydroxide <u>aqueous</u> solution</u>
	8L <u>8P</u>	<u>With more than 2.5% but less than 25% tetramethylammonium hydroxide</u>
	<u>8L</u>	<u>With not more than 2.5% tetramethylammonium hydroxide</u>
3423	8L <u>6C</u>	<u>Tetramethylammonium hydroxide, solid</u>
<u>3551</u>	<u>12FZ</u>	<u>Sodium ion batteries</u>
<u>3552</u>	<u>12FZ</u>	<u>Sodium ion batteries contained in equipment</u>
<u>3552</u>	<u>12FZ</u>	<u>Sodium ion batteries packed with equipment</u>
<u>3553</u>	<u>10L</u>	<u>Disilane</u>
<u>3554</u>	<u>8L</u>	<u>Gallium contained in manufactured articles</u>
<u>3555</u>	<u>3L</u>	<u>Trifluoromethyltetrazole sodium salt in acetone</u>
<u>3556</u>	<u>12FZ</u>	<u>Vehicle, lithium ion battery powered</u>
<u>3557</u>	<u>12FZ</u>	<u>Vehicle, lithium metal battery powered</u>
<u>3558</u>	<u>12FZ</u>	<u>Vehicle, sodium ion battery powered</u>
<u>3559</u>	<u>9L</u>	<u>Fire suppressant dispersing devices</u>
<u>3560</u>	<u>6C</u>	<u>Tetramethylammonium hydroxide aqueous solution</u>